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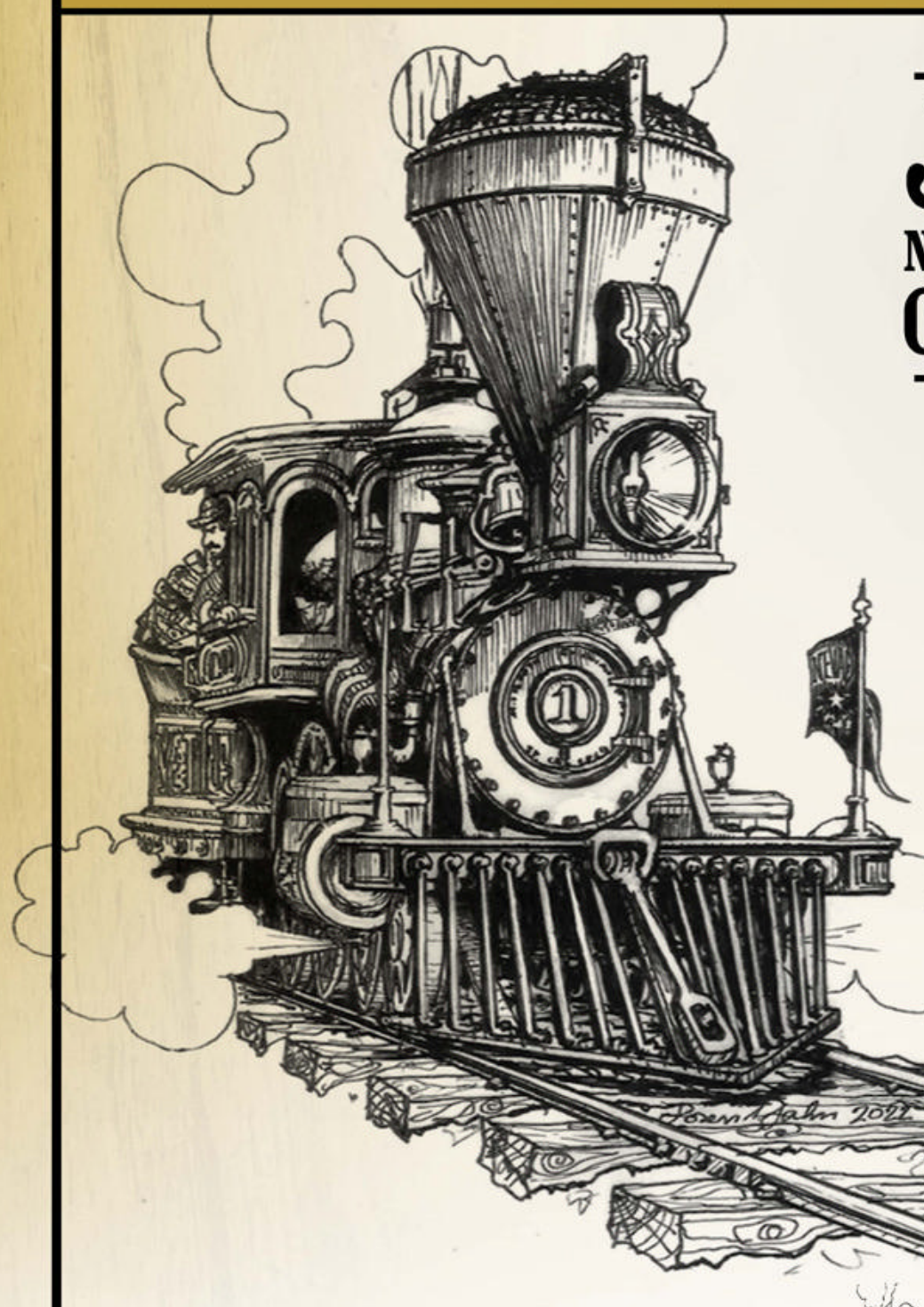

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ON THE COVER

Five Nickel Plate Road Berkshires line up at Bellevue, Ohio, in October 1945. They represent the pinnacle of Lima "Super Power" steam technology. George Jay Morris for NKP, John B. Corns collection

CONTENTS

Paradise lost — and found

Picture it: Orbisonia, 1941. The shop and yard of Pennsylvania's narrow gauge East Broad Top are humming with activity during William Moedinger's visit for TRAINS magazine (see page 6).

In 2022 you'll be able to relive those times with the revived East Broad Top operation. Nonprofit EBT Foundation Inc. expects to have steam-powered passenger trains back on the railroad in 2022 for the first time since it shut down in 2011. This year also marks the 150th since construction on the 33-mile coal-hauling railroad started in 1872.

We still love steam, some 60 years after the last mainline fires were dropped in North America. This volume provides a fantastic look back at an important era in railroading. We see the pinnacle of steam locomotive design, according to one renowned historian. David P. Morgan provides a definitive look at the 4-6-2 Pacific type. The legacy of the USRA locomotive designs is examined. And first-person accounts put us in the cab on the Southern Pacific, Pennsy, and Union Pacific.

Today, new opportunities to relive steam in 2022 come with U.S. Sugar 4-6-2 148 in South Florida and Western Maryland Scenic 2-6-6-2 1309. And steam preservation stalwarts like Nickel Plate 765, Pere Marquette 1225, and Union Pacific 4014 are still going strong.

So, remember steam's past — and look forward to its future.

EDITOR

East Broad Top freight extras meet at Cooks, Pa. Recent events on the EBT bring new hope for a repeat of this scene. Philip R. Hastings

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Baltimore & Ohio's northbound *Cincinnatian* rolls into Sidney, Ohio, in September 1954 behind P-7e class Pacific 5317. Mert Leet, Denny Hamilton collection

FROM
AUGUST
1941
TRAINS
MAGAZINE

PENNSYLVANIA'S LAST NARROW GAUGE LINE IS INNOVATIVE, RESOURCEFUL, AND PROSPEROUS

East Broad Top IN 1941

By **William Moedinger Jr.** // Photos by the author

Train No. 2 highballs out of Saltillo passing the Saltillo wye. The next 4 miles to Tunnel No. 1 are upgrade, averaging 2.5%, the steepest on the main line.

The East Broad Top Railroad & Coal Co., despite its title, is a railroad and not a coal company. Coal is 70 percent of its traffic, and the Rockhill Coal & Iron Co. owns a majority of the stock, but the East Broad Top is all railroad — narrow gauge railroad, heavy duty 3-foot gauge track built and maintained to high standards. The line provides general transportation between the East Broad Top coal field in south-central Pennsylvania and the Pennsylvania Railroad's main line at Mount Union, two-thirds of the way from Harrisburg to Altoona.

The East Broad Top is one of a class of railroads that is rapidly vanishing. In the 1870s the narrow gauges received the final impetus that was to increase their number by 148 and enhance their length by 4,000-odd miles. EBT stands today as the only survivor of three 3-foot gauge railroads that served as feeders to the PRR's Middle Division between Harrisburg and Mount Union. The other two, the Tuscarora Valley Railroad and the Newport & Sherman's Valley Railroad, vanished during the 1930s. More than that, EBT stands today as the only really active narrow gauge railroad in the state of Pennsylvania. And above all, it possesses the finest narrow gauge roadbed and track in the United States, freight rolling stock equal in construction and appearance to that of any standard gauge railroad, and motive power, while not the heaviest or most powerful, equal in every other respect to that of any slim gauge railroad in this country.

Many have wondered why East Broad Top was built as a narrow gauge when the PRR, with which it was built to connect, was always standard. EBT records do not answer this question. The only reference to the matter is a short resolution in the minutes of a special meeting of the board of directors held June 6, 1872, which reads, "Resolved, that the gauge of this railroad be fixed at three feet." C. D. Jones, EBT's current operating vice president, refers to the narrow gauge matter as "a mystery and an unsolved secret of the distant past." However, it is reasonable to suppose that had the railroad been built in the late 1850s or in the early '60s the gauge would have been standard. When construction was commenced in 1873, "narrow gauge fever" gripped the land. It is likely possible that EBT's organizers were impressed with and influenced by the tremendous swing to the 3-foot gauge during the 1870s.

East Broad Top officials have given serious consideration over the years to widening the track. However, the idea was discarded a few years ago because the conversion would be exceedingly costly; it would require a great deal of new capital and would not increase revenue.

EBT also operates as a standard gauge railroad in the Mount Union area. A mile or so southeast of town along the main line there is a large coal grading and cleaning plant. A third rail has been laid on nearly all of the tracks in this area, and EBT purchased two 0-6-0 yard goats for use on them. Since nearly all the coal the EBT brings down from the mines is consigned to foreign roads, a large number of standard gauge hopper cars must be shifted and loaded, and the standard gauge switchers are better able to handle these larger cars, especially when they are loaded. All coal mined on the EBT is hauled as far as this coal plant in narrow gauge cars. Here the coal is unloaded and sent through the coal plant. When it comes out, that consigned to foreign roads is loaded into standard gauge cars, while that consigned to industries along the EBT is reloaded into slim gauge hoppers.

Mixed train No. 2 consisting of a 2-8-2, 15 empty coal cars, and a wooden combine meanders somewhere between Orbisonia and Shirleysburg through the southern Pennsylvania hills on its way to the coal fields. C. A. Brown

EBT 2-8-2 No. 17 steams near the Mount Union station with train 2. The wide space between the station and tracks was once the Pennsylvania main line, which has been relocated about a block to the right.

No. 17 and the combine have turned on the wye at Robertsdale, backing down from Woodvale. Just before departure, the engine will uncouple and run down the main line to pick up a train of loaded hoppers from the siding.

The 33-mile EBT main line climbs 1,300 feet on grades and curves unusually conservative for a narrow gauge mountain railroad. This view near milepost 26 and south of Tunnel 2 shows the road's typical right-of-way.

TWO ROUTES TO THE JUNIATA

The story of the East Broad Top began in 1847, when the Pennsylvania Railroad began to build its line between Harrisburg and Pittsburgh. The railroad followed the Juniata River, which provided an essentially water-level route far into the mountains. Fifteen or 20 miles to the south of the PRR's line were the Broad Top coal fields, and it was for this reason that in 1853 and '54 the Huntington & Broad Top Mountain Railroad was constructed to haul coal to the new railroad and to the 1834 canal along the Juniata River.

In 1855 a group of retired Philadelphia businessmen boarded a train in that city and journeyed to Huntingdon, 97 miles west of Harrisburg, where they transferred to the H&BT for the last leg of their trip to the mountain, then a wilderness resort. The group was enjoying a vacation and had established headquarters in Broad Top City. During their wanderings over Broad Top Mountain, they accidentally stumbled across some undiscovered outcroppings of coal on the east side.

In April 1856, by means of a special act of the Legislature, these same men formed a corporation having the authority to operate either a railroad, a coal mining company, or both. These men realized that the railroad was the important thing, a railroad that would carry the coal from the newly discovered field to the Juniata River valley, where transportation to the growing industrial East was provided by both the new Pennsylvania Railroad and the old canal, still an important transportation artery but eventually supplanted by the PRR. They reasoned that mining and the development of the new field would come automatically with the railroad.

No construction was undertaken until 1873, for there was considerable controversy over where to join with the PRR and with the canal. There were two routes available. The more direct one would meet the Juniata River at Mapleton, 88 miles west of Harrisburg. The other would join the Juniata at Mount Union, 85 miles west of Harrisburg. From an operating standpoint, the Mapleton route was superior, for it was 10 or 12 miles shorter with easier grades and curves. The Mount Union route was chosen, however, because of the iron ore mines and pig iron blast furnaces in the Orbisonia district along the way. On Oct. 15, 1874, the railroad was opened between Mount Union and Robertsdale, 30 miles.

COAL TRAINS TO MOUNT UNION

The men who founded East Broad Top and those who later carried on their work seemed to have but one purpose in mind, that of transporting coal from the coalfields to the canal in earlier days and to the Pennsylvania Railroad later on. The EBT's entire history reflects the workings of a cautious and conservative group who realized that their railroad could become prosperous if its activities were

Train No. 2 tackles the steepest grade, just north of Tunnel No. 1. At 48 inches, EBT locomotives have relatively large drivers for narrow gauge operations.

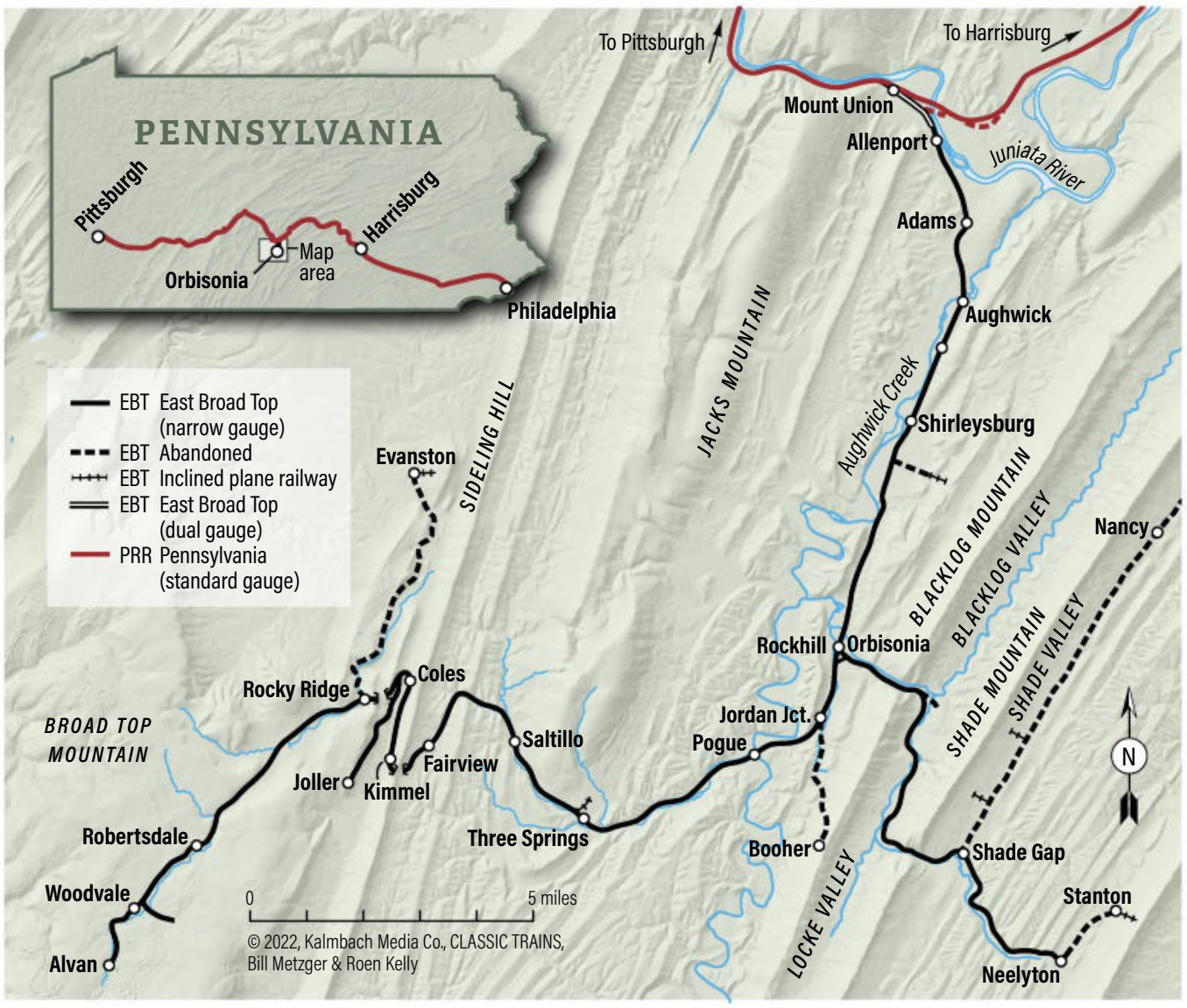
confined to the original objectives of the founders. In the hands of many a railroad promoter of the 1870s, the EBT might have been given some grandiose name based on unbridled visions of expansion. It might easily have become Pennsylvania's version of the Denver, South Park & Pacific, with nothing more to show today. While the transporting of coal was always a primary objective, the EBT's first 10 years found general freight and passenger business the more important items. By 1885 the railroad owned 7 locomotives, 6 passenger cars, and some 250 freight cars, of which only 40 were coal cars.

About this time, the East Broad Top began to grow. In 1885 the Shade Gap Railroad opened between a connection with the EBT at Rockhill Furnace and Shade Gap; it was soon extended to the ore mines at Nancy, 11 miles from Rockhill Furnace. EBT immediately leased the new road. In the next few years, the EBT extended its main line to Woodvale, and finally to Alvan. Another new line, the Booher Branch, was built, extending some 2½ miles south from the EBT main line at Jordan Junction.

On May 1, 1908, another new railroad was opened as a feeder to the East Broad Top. It was the Rocky Ridge Railroad, extending from Rocky Ridge on the EBT main line to Evanston, nearly 5 miles. EBT leased this road too. Also in these first few years of the new century the EBT constructed additional spurs. One was the Coles Valley Branch, extending from Coles to Joller, 2.3 miles. Then there was a short branch built east from the main line just south of Shirleysburg. In these same years the Shade Gap Railroad was extended southeast from Shade Gap to Neelyton and later to Stanton.

On Dec. 22, 1913, the Shade Gap and Rocky Ridge railroads were merged with the East Broad Top. One became the Shade Gap Branch while the other became the Rocky Ridge Branch. Neither road owned any equipment, so it was perfectly in order that both should become part of the railroad on which

East Broad Top in 1941



they depended for their existence.

At the end of 1916 the East Broad Top had reached its greatest extent, consisting of about 53 route-miles. Yard tracks, sidings, etc., accounted for another 20 miles, bringing total EBT track mileage to 73. At this time records indicate that the railroad served six coal mines, three rock quarries, three large silica brick plants, and a number of smaller industries, as well as handling general merchandise and passenger traffic at eight small towns.

In 1941, the East Broad Top is essentially

the same as it was in the early 1920s except for a few improvements and retrenchments. There is the 33-mile main line between Mount Union and Alvan to which all the other spurs and branches connect. The Shade Gap Branch now terminates at Neelyton, some 10 miles southeast of Rockhill Furnace. Also, the portion running northeast from Shade Gap to Nancy was abandoned. The Rocky Ridge Branch, which originally ran north from the main line to Evanston, lost about half its length in spring 1936 when tor-

Mikado No. 15, shown in the siding at Robertsdale, shares the same specifications with sister 14, even though they were built years apart. The EBT owns six narrow gauge Mikados and one narrow gauge 2-6-2 Prairie type.

Passenger unit M-1 was built with a steel body by the EBT with trucks and motors supplied the J. G. Brill Car Co. It operates when coal mine operations do not warrant the dispatch of a full mixed train. It is seen on the Saltillo wye.

rential rains caused a mountain stream to severely damage a bridge. When the flood occurred, several freight cars were marooned at the northern end of the line. EBT repaired the bridge sufficiently to tow these cars across, whereupon the isolated track was torn up. Then there is the Coles Valley Branch, running slightly more than 2 miles to Joller. There is also a spur or two at the extreme southern end of the main line leading to the various coal mines in this district. Both the Booher Branch and the short spur just south of Shirleysburg have been abandoned.

SHORTLINE PASSENGER SERVICE

The East Broad Top is one of the few short lines still operating passenger service. The timetable calls for seven daily-except-Sunday passenger trains. Four of these provide two round trips between Mount Union and Woodvale, 32 miles. The timetable also lists trains Nos. 7 and 8 between Orbisonia and Alvan and train 5 from Woodvale to Robertsdale in the evening. If you plan a trip on the EBT, do not count on trains 7 and 8 to provide you with transportation. They are miners' trains and operate only when the coal mines are working. From November to April they operate fairly consistently Monday to Friday, but during the summer months and on Saturdays all year they run irregularly.

Except for the miners on Nos. 7 and 8, passenger traffic is insignificant. This has been the case for some time, and prompted the road in 1926 to acquire a gas-electric unit from the J. G. Brill Co. of Philadelphia. M-1, as it is designated, operates when the coal mines are closed. When the mines are open and on occasional other days, EBT operates the coal trains as mixeds so as to coincide with passenger schedules. On these days, one of the ancient wooden open-platform combine cars is coupled to the rear of 18 or 20 hopper cars.

Ordinarily, mixed trains are not too desirable for their passengers (except for railroad fans, of course), but EBT's mixeds usually lack the annoyances common to this type of service. On the of EBT, there is little setting out or picking up of freight cars en route. Southbound the train picks up the empty hoppers just south of Mount Union; these are bound for one of the mines at the south end of the line. Northbound the same holds true, except the hopper cars are loaded with coal and are dropped before arrival at the Mount Union depot. Ordinarily the only stops are at passenger stations. Between stations the trains roll along smartly. Running times for southbound trains are considerably longer than for northbounds because southbound is nearly all upgrade, and there are longer stops in this direction. Occasionally morning train 2 out of Mount Union must do a good deal of yard work in Orbisonia, and the whole schedule is thrown off, sometimes by two hours.

Freight business keeps the East Broad Top's wheels turning. About 70% of freight traffic consists of coal originating at either Alvan, Woodvale, or Robertsdale on the main line and at Joller or the Coles Valley Branch. There is also a substantial carload traffic in rock demanded by the silica brick plants in Mount Union. The rock is quarried on top of the mountain just south of Three Springs. EBT still enjoys a meager less-than-carload business, which is handled in narrow gauge boxcars in the regular freight trains. Since there is no regular passenger or freight service on the branches, l.c.l. traffic to points along those lines is handled by East Broad Top Transit Co., the railroad's bus and truck subsidiary.

Most of EBT's passenger and l.c.l. traffic has been lost to private automobiles and trucks, and little can or could have been done about it. However, in the mid-1930s highway trucks began seriously to menace carload traffic. In fact, EBT Operating Vice President Jones says, "It was not uncommon to see 50 to 100 loaded coal trucks pass the general offices at Orbisonia on their way from the mines." After watching this performance for a time, the railroad decided to try working with the truckers instead of against them. A slight reduction in the freight rate, the offer of free use of unloading trestles standing idle in the Orbisonia yards, the EBT station agent acting

Two standard gauge 0-6-0s handle traffic in the dual gauge yard at Mount Union. The quadrilateral water tank is a characteristic EBT design. Philip R. Hastings

as local coal sales agent, and the erection of large billboards staring the truckers in the face, telling them of the miles of mountain roads saved by getting their coal at Orbisonia, did the trick. The coal truckers are now working with the railroad. The truckers not only save the wear and tear on their trucks by not going up the mountains to the mines, but EBT nets a 20- to 22-mile haul out of it.

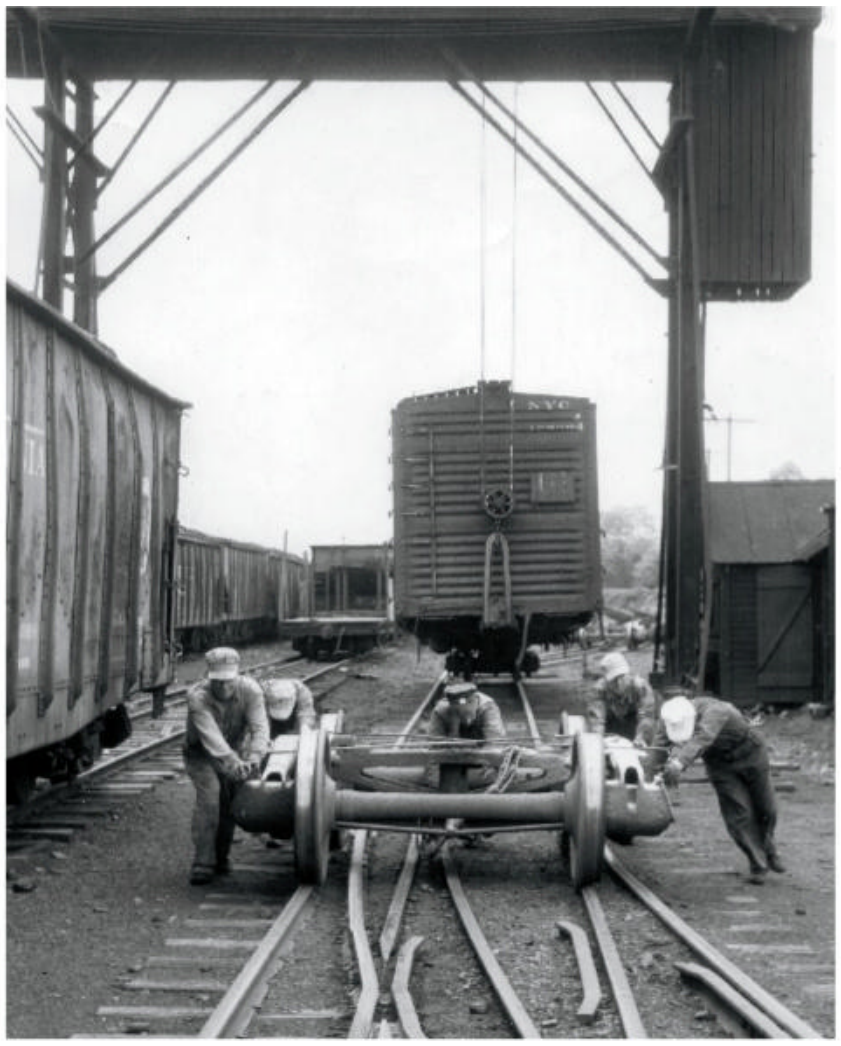
THE TIMBER TRANSFER

East Broad Top officials encountered — and solved — another problem in the early 1930s. Being a narrow gauge road, all carload traffic received from or consigned to points on foreign railroads had to be transferred from cars of one gauge to cars of the other. The cost of transferring the merchandise at Mount Union was eating seriously into revenue. In some cases, depending on the commodities involved, the transfer costs were almost prohibitive. And in some instances the merchandise was fragile and the handling in the transfer resulted in disheartening damage claims. EBT solved the problem with equipment it had on hand. It modified a number of narrow gauge freight car trucks for use under standard gauge carbodies, and it repurposed a crane built to handle traffic that had disappeared.

In the 1920s the McKelvey Brothers Lumber Co. began cutting large tracts of timber in the Broad Top country. The EBT carried the wood to Mount Union. To facilitate the transfer of the logs from narrow gauge flatcars to standard gauge ones, EBT erected a stationary crane with a movable carriage spanning two tracks in the Mount Union yards. When the McKelvey shipments ended in 1930, the Timber Transfer, as the crane was called, remained idle most of the time. Desiring to end the inefficient practice of transloading cars at Mount Union, EBT officials decided this crane could be utilized to lift standard gauge cars from their trucks while narrow gauge trucks were substituted.

It works like this: When a PRR engine spots a car on the interchange track, it is picked up by one of EBT's standard gauge shifters, which whisks it to the Timber Transfer (it's still called by that original name, even though it no longer transfers timber). A crew of four men and a crane operator do the rest. The brake rigging is disconnected and a specially constructed steel sling is fastened

A 1935 fan trip pauses in the yard at Orbisonia. Visible above the first coach is the iconic timber transfer crane that aided in cars' conversion to narrow gauge trucks. Warren W. McCleary



An NYC boxcar undergoes conversion to narrow gauge trucks for travel down the EBT. Workers roll a standard gauge truck away from the car to complete the process. Philip R. Hastings

Standard gauge NYC boxcar 52543 towers over the tender and narrow gauge coal cars on train 3 climbing Aughwick Hill just south of Mount Union.

Mikados 16-18 are the railroad's heaviest and exert 3,060 pounds more tractive effort than the famous 470 series on the Rio Grande narrow gauge. Here, No. 17 lugs a cut of converted standard gauge freight cars north through Orbisonia, proving its might. East Broad Top

around a coupler shank. The crane operator then lifts the carbody off the truck so as to clear the king pin. The standard gauge truck is rolled away and the crew returns with a narrow gauge truck. The crane carriage is moved slightly to center the king pin bearing hole with the king pin of the narrow gauge truck, and the carbody is lowered. After repeating this procedure at the other end of the car, the brake rigging is secured and the car is ready to roll to any point on the EBT.

Although the practice is rare on other narrow gauge railroads, it works particularly well on the EBT for several reasons. Even if you have never seen a standard gauge car on narrow gauge trucks, you can appreciate the amount of overhang and the tendency toward top-heaviness. EBT track, especially on the main line, is exceptionally well engineered and maintained and is up to the task of hauling standard gauge cars overhanging the rails 3 feet on each side. Also, the sharpest curve on the entire railroad is only 17 degrees, which, although sharp, is broad enough to handle most standard gauge cars. Many slim gauge roads have curves much more severe than that.

Today the 33-mile main line and the 2.3-mile Coles Valley Branch account for most of EBT's traffic because both serve coal mines. Excluding Mount Union, there are 15 stations along the main line, 10 of which boast an aggregate population of about 2,500 persons. Only six are large enough to be called towns, the two largest being Orbisonia and Robertsdale, each with a population of around 700 or 800. The Shade Gap Branch serves five stations, only two of which might be called towns, and with combined population not exceeding 500. This branch has had no passenger service for a number of years, while freight traffic today is irregular. In 1940, however, the Shade Gap Branch traffic was augmented considerably during construction of the Pennsylvania Turnpike. Neelyton was the closest railhead for many miles along this highway. Many carloads of road-building supplies such as cement were hauled in over the Shade Gap Branch. Most of the cars were standard gauge.

Since about 1936 the Rocky Ridge Branch has seen little or no traffic. This branch provided EBT's only coal shipments handled in standard gauge hopper cars direct from the mines to points along foreign railroads, the reason being that the coal was not graded and cleaned at the plant in Mount Union but consigned directly as it came from the mines.

RUNAWAY AT ROBERTSDALE

As a mountain railroad, the East Broad Top has had its share of hair-raising occurrences. Vice President Jones tells of an incident at Robertsdale several years ago. Robertsdale lies almost on top of Broad Top Mountain, 1,810 feet above sea level. The early morning passenger train to Mount Union was on a siding there waiting to meet two trains. The first was a train of empty hopper cars; the second, 10 minutes behind it, was a miners' train. The freight came rolling through Robertsdale right on schedule, and, as was the custom, a few hundred yards after passing the passenger train, its caboose was uncoupled and allowed to coast back onto a safety track without stopping the freight on the upgrade, for the train of empties was bound for Alvan, 3 miles farther south.

On this day, however, someone forgot to set the switch to the safety track, and when the caboose was uncoupled it rolled right on down the main line past the passenger train in the siding. The crew on the engine realized exactly what had happened when they saw the caboose coast merrily by them headed for a cornfield meet with the approaching miners' train. The crew lost not a minute uncoupling the engine from its train and getting out on

The largest bridge on the EBT crosses Aughwick Creek near Pogue, southwest of Orbisonia.

Photographers clamor to photograph an excursion exiting 1,150-foot Tunnel 2 26 miles from Mount Union. The trip was sponsored by the Lancaster NRHS.

A watchman is stationed at 800-foot Tunnel 1 in winter to go ahead of the train and look for obstructions in the curved tunnel, thus necessitating the shanty.

the main line to chase the runaway caboose.

There is an 8-mile downhill grade north from Robertsdale. The brakeman rode the pilot of the pursuing engine, holding on with one hand and reaching for the handrail of the caboose with the other. Already the exhaust of the oncoming miners' train was audible, but every man stuck to his post. Closer the outstretched brakeman's hand came to the caboose. Finally it was close enough to grasp the handrail of the lurching crummy; the man on the pilot pulled himself onto the platform, set the hand brakes, and brought the car to a stop just in time to flag the approaching train. Mr. Jones adds, "It is too bad there wasn't a motion picture camera as part of the standard locomotive equipment to record this event, for I am sure that the films could have been sold to Hollywood."

A NARROW GAUGE SURVIVOR

If not for the heavy traffic from the mines, the East Broad Top would probably be like Pennsylvania's other narrow gauge railroads, either completely gone or merely two streaks of rust. Except for the mining and the few industries directly dependent on the products of these mines, there are no important industries along the railroad. The southern end of the main line, where the mines are located, taps an area otherwise devoid of economic activity.

If you ride the EBT and chance to strike up a conversation with members of the crew, one of them is sure to tell you the following story in connection with that few hundred feet of track. It seems that, back in the depths of the depression, when the government was handing out rather generous appropriations to be used for federal projects, Fulton County received an appropriation of $50,000 to be used expressly for railroad grade crossing elimination, yet that few hundred feet of track crossed no roads and so there were no grade crossings to eliminate.

The East Broad Top's main shops are at Orbisonia, and all the rolling stock, with the exception of one private car and several passenger coaches purchased secondhand from the abandoned Boston, Revere Beach & Lynn, were built in these shops. Orbisonia built EBT's 299 30- or 35-ton-capacity steel hopper cars. Other freight equipment includes 43 miscellaneous cars, mostly box and flat types. The nine steam locomotives currently on EBT's roster were built by Baldwin. Six are 2-8-2s of 1911-1920 vintage, one is a 1908 2-6-2, and two are standard gauge 0-6-0s that work the dual gauge trackage at Mount Union. All locomotive repairs are made at Orbisonia except those on the 0-6-0s. Those engines are kept in a two-stall enginehouse at Mount Union, and when repairs are necessary a narrow gauge tool train brings the needed equipment from Orbisonia. Parts requiring heavy repairs are removed from the engines and taken to the Orbisonia shops.

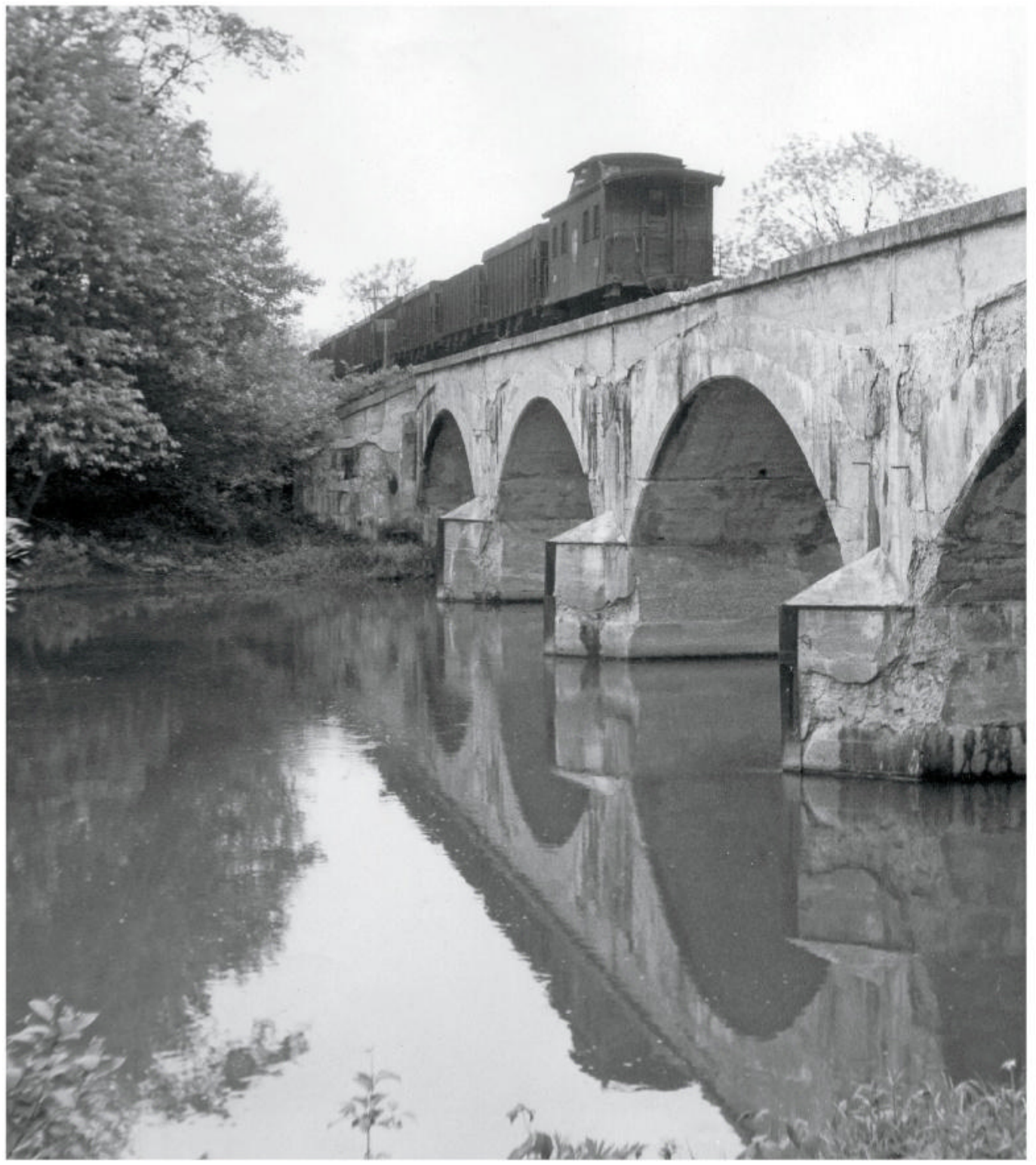
Between EBT's two tunnels is a real horseshoe curve, Coles Curve. At this point is the junction with the winding Coles Valley Branch. During the winter months a watchman is stationed at each tunnel. As a train approaches, the engineer warns the watchman with two short whistle blasts. The watchman then walks far enough into the tunnel to ascertain that there are no obstructions, and as the train looms in sight he signals all clear by waving a white flag.

Before the northbound mixed trains leave Robertsdale one would think a one-car passenger train was about to pull out. The engine and combine car turn on the wye and stop in front of the station. Just before departure time the engine uncouples from the coach, runs down the main line, and picks up a string of loaded hopper cars. The brakeman then frees the hand brakes, allowing the coach to coast down onto the rear of the train. At Mount Union, mixeds pick up their freight cars in the yard after departing the EBT depot.

The Lancaster Chapter of the National Railway Historical Society has operated two excursions over the line, on May 3, 1936, and May 19, 1940. Well over 200 fans joined in the second excursion, which covered the entire main line and the Coles Valley Branch. This short branch has never had passenger service, but it is probably the most spectacular stretch of track on the EBT. It climbs the 2.3 miles to Joller on an average grade of 2.7%, and in this short distance there are 25 curves.

But one need not wait for special excursions to ride the East Broad Top. A daylight round trip, 9:20 a.m. to 3:15 p.m., from Mount Union to Woodvale, can conveniently be made during a stopover from PRR trains between Altoona and Harrisburg, either direction. It's a ride worth taking!

WILLIAM MOEDINGER JR. was an early contributor to Trains, *with bylines spanning from 1941 to 1976. After 13 years as a Pullman conductor, he was part of a group of Lancaster County (Pa.) men who resuscitated the Strasburg Rail Road, of which he was president 1970-88. Moedinger died in 2010 at age 97.*



An extra with 2-8-2 No. 16 crosses Aughwick Creek between Shirleysburg and Mount Union. Philip R. Hastings

CANADIAN NATIONAL Regular steam operation on Canada's "government road" ended when 4-8-2 No. 6043 brought train 76 into Winnipeg on April 25, 1960. But that wasn't quite the end of the show, for Canadian National maintained two 4-8-4s and a 4-8-2 to pull excursion trains for another two decades. In September 1965, 4-8-4 No. 6218 heads into the setting sun near Mariposa, Ontario during its return trip to Toronto on an Upper Canada Railway Society fall foliage excursion. James A. Brown

CANADIAN PACIFIC The year 1960 also saw the finale of steam operations on Canadian Pacific, which wrapped things up in June when diesels finally took over all Montreal commuter trains. Exhibiting the high standard of care accorded to most CP steam power up to the end, 4-6-2 No. 1258 simmers at Montreal in early 1960. The engine is one of 102 light Pacifics, class G5, CP acquired during 1944–48 to replace 4-6-0s and 4-6-2s dating from the early 20th century. John A. Middleton III, Bob Bahrs collection

THE BIG ENGINES

AMERICAN STEAM-LOCOMOTIVE DESIGN REACHED ITS PEAK IN 1937, ARGUES THIS CRITIC. BIGGEST WAS NOT ALWAYS BEST, HE SAYS, NOR DID DESIGN ALWAYS MATCH APPLICATION

By **Robert A. Le Massena**

One sure way to start a fight is to make disparaging remarks about someone's favorite steam locomotive. The resulting argument will eventually involve dimensions, performance, and eye appeal as standards of superiority. The debaters will discover that their claims and counterclaims have little mutual basis for meaningful comparisons, particularly when the adjectives "biggest," "best," and "mightiest" are involved. Superlatives, when applied to locomotives, have had too many interpretations for universal accord among iron-horse fanciers. Maxima of one kind or another have been cited for weight, height, width, length, boiler, firebox, cylinders, drivers, horsepower, drawbar pull, and so on, resulting in more confusion than enlightenment. Comparing actual or calculated performances is all but impossible. The three major builders used different computational methods, all of which underestimated what a locomotive could do in service. Even actual road tests could not be compared with sufficient accuracy, for myriad factors had a measurable effect on performance. Designers and master mechanics alike were frequently amazed at what a new locomotive could or could not do. In the end, however, there was reasonable agreement that a "big" locomotive looked big and acted big; other engines just didn't measure up by comparison.

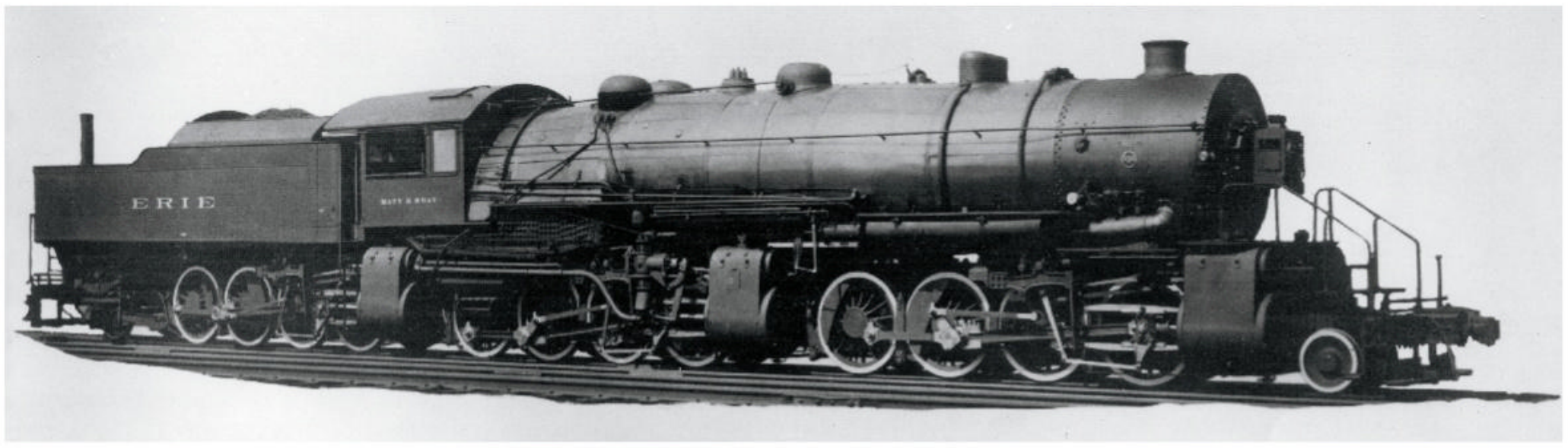
One of the earliest enormities of the rail was the Erie's 2-8-8-8-2 Triplex of 1914, which was afflicted with cylinders so cavernous and a grate so tiny that its pressure gauge fluctuated in precise accord with the movement of its pistons. Two later models of this monstrosity were built with larger grates (121 square feet instead of 90) so that more steam could be produced. One report claimed that a speed of 14 mph was attained with a 250-car, 18,000-ton train on almost level track. The Virginian was less fortunate with its terrible 2-8-8-8-4, which was constructed with smaller cylinders and drivers, but with only 108 square feet of grate surface. It attained unglorified fame by running out of steam only a short distance beyond the yard limit signs. Undeterred, the Virginian purchased several 2-10-10-2s with even larger cylinders in 1918. Although the 2-10-10-2s' grates were insignificantly larger than those of the Triplex, their boilers were considerably bigger, and the Mallets managed to get heavy trains over the road at speeds more often than not below 10 mph.

In 1918 the Pennsylvania built a simple-expansion 2-8-8-0 with 250-psi pressure and 112 square feet of grate area in its Belpaire firebox. With a machinery factor 20% greater than that of the 2-10-10-2, it set records for drawbar extraction.

All of these dinosaurs, like their flesh-and-blood predecessors, were too ponderous for their continued existence, and they were succeeded by more agile species.

RENAISSANCE IN THE 1920S

World War I and the economic dislocations that followed stifled the production of



The Erie's three class P-1 articulateds were essentially 2-8-8-0s with another eight-drivered engine beneath the tender. Baldwin delivered the first, No. 5014, in 1914. The biggest problem was that of boiler capacity: the feedwater pump couldn't deliver water to the boiler fast enough for the fire to turn it to steam. Additionally, when a Triplex was in the shop, it was like having three Consolidations or Mikados out of service. Erie

FROM
AUGUST
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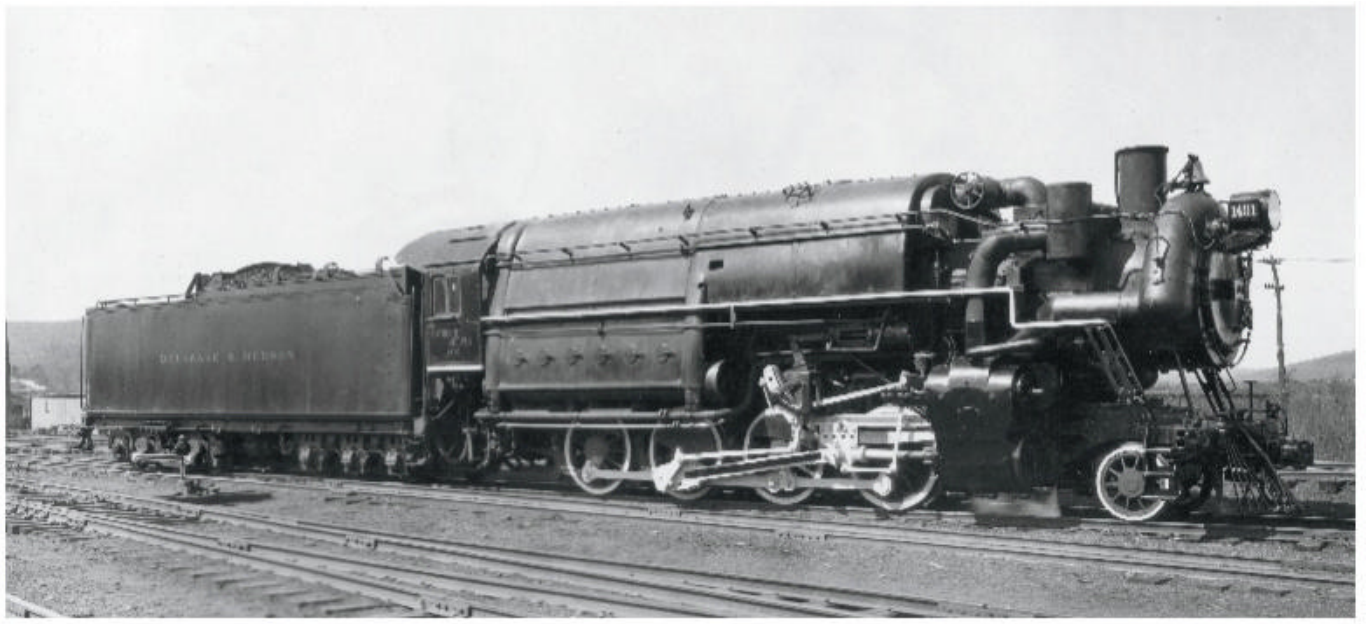
MAGAZINE

PRR Q-2 4-4-6-4 duplex 6187 brings a westbound out of Fort Wayne, Ind., on an 0.51% ruling grade with 68 cars in February 1949. Prototype 6131 of 1944 led to 25 more, Nos. 6175-6199, in 1945. D. Allen Bauer

king-size locomotives for several years. A renaissance was evident in 1924 when the Delaware & Hudson received a high-pressure, watertube-firebox, cross-compound 2-8-0 from Alco. The locomotive was intended for low-speed tonnage service, and ample boiler capacity enabled it to maintain high drawbar pulls over a respectably wide range of lower speeds. Lima Locomotive Works, however, was not in agreement with this method of railroading; its 1925 experimental 2-8-4 with large boiler, big grate area, small cylinders, and bigger drivers was designed to deliver its maximum power at higher speeds. Excellent over-the-road performance was in direct opposition to the then-prevalent maximum-tonnage, minimum-speed gospel. Despite the 2-8-4s immediate success, any number of tonnage worshipers refused to accept the new doctrine of speed first, tonnage second. Nevertheless, both the Illinois Central and the Boston & Albany got the message and ordered near-duplicates.

In 1926, while Great Northern was converting its lumbering compound 2-6-8-0s into single-expansion machines, Union Pacific received the first of its Alco-built three-cylinder 4-12-2s. The long-barreled newcomer, a compromise between draft horse and race horse, could make 60 mph. Baldwin's experimental 4-10-2 of that year embraced a combination of unorthodox features. It was a three-cylinder compound with a watertube firebox, 350 psi boiler pressure, and adequate grate area. Even though it shattered records for power on the Pennsylvania's Altoona test plant and outperformed the incumbents on seven heavy-duty carriers, no one wanted the ahead-of-its-time locomotive. It was neither sold nor duplicated.

The following year brought further variety to the motive-power circus. D&H startled onlookers with another giant 2-8-0 similar to the previous one but with 400 psi on the gauge. Lehigh & Hudson River received a conventional 2-8-0 with 100 square feet of grate area (a record for the type) and 220 psi; this was indeed a little giant. As an elongation of this design, 2-10-0s with 105 square feet of coal-burning surface (also a record) were bought by Lehigh & New England and Western Maryland. With its pops set for 250 psi, the WM engine appeared to be a simpler way of achieving the Baldwin 4-10-2's objectives. Then, as if this bewildering array of big power were not enough, Denver & Rio Grande Western took delivery of some simple 2-8-8-2s which eclipsed everything else. Its 137-square-foot grate and 240-psi pressure assured a copious supply of steam to the engines, which had a machinery factor second only to that of the Pennsy's 2-8-8-0. There wasn't a locomotive anywhere that came close to it.



D&H 1401, the *John B. Jervis*, was the second of the road's quartet of experimental high-pressure locomotives. They were all complex and the high steam temperatures required special valve lubricants. D&H

CB&Q 2-10-4 VS. ERIE 2-8-4

The divergence between the high-tonnage, low-speed and vice-versa camps was strikingly illustrated by Burlington's 2-10-4 built in 1927 and Erie's booster-equipped 2-8-4 constructed a year later. CB&Q wanted more tonnage with less fuel consumption; the Erie sought more ton-miles per train-hour by raising train speeds. The Erie got what it wanted by operating at speeds close to that which yielded maximum power (about 45 mph); a slight change in gradient might reduce the speed by, say, 10%. The 2-10-4 was operated at speeds well below that for peak power (about 20 mph); a similar incline would cut its speed by 50%. The Burlington 2-10-4's big boiler, 107-square-foot grate, and 250-psi pressure, thus misapplied, were more ornamental than useful in the production of ton-miles at minimum cost.

The growing trend toward more total power per locomotive and more power per ton of locomotive weight surged into new territory during 1929, with 100-square-foot grate areas and 250-psi boiler pressures becoming commonplace. Chicago & North Western went to 275 psi for its dual-service 4-8-4 with 76-inch drivers, while the Great Northern took delivery of some with 73-inch drivers and 250 psi. These latter locomotives were capable of generating unusual quantities of steam because their Belpaire fireboxes could evaporate about 25% more water than conventional ones with equal grate area.

At the same time, GN and Northern Pacific put into service two behemoths which exemplified their high-tonnage philosophies. GN built a simple 2-8-8-2 with a Belpaire firebox and a machinery factor that placed it midway between the Pennsy 2-8-8-0 and the D&RGW 2-8-8-2. Its small drivers betrayed its mission: maximum tonnage at minimum speed. The NP locomotive, a simple 2-8-8-4, possessed incredible potential power. Its machinery was

Left: Erie S-1 2-8-4 3319 hustles a westbound freight from Maybrook near Michigan Corners, N.Y., August 1942. The Erie sought more ton-miles per train-hour by raising train speeds. Donald W. Furler **Right: Burlington's 2-10-4s of 1927 were designed to handle more tonnage with less fuel consumption.** Harold K. Vollrath collection

like that of the Rio Grande 2-8-8-2, but its firebox included an unsurpassed grate area of 182 square feet. Its boiler pressure, higher than that of its contemporaries, equaled the PRR 2-8-8-0's: 250 psi, an astonishing figure for such a large boiler. This unsurpassed combination of steam pressure and grate area was not approached for a decade, and the potential power per ton of weight of the NP 2-8-8-4 always ranked it among the best of the big engines. Although it might have produced more drawbar horsepower than any other locomotive built, it most likely never demonstrated what it could do. Instead of receiving high-grade bituminous coal, its gigantic firebox was fed a diet of subbituminous fuel having a heating value only 60% of what the Pennsy considered adequate for its motive power.

Furthermore, NP's 2-8-8-4 was assigned to service on a sawtooth-profiled division where speeds rarely exceeded 30 mph, except in the downhill direction. Even its builders later expressed some disappointment over its uninspiring performance. This was a typical example of a high-horsepower locomotive employed well below its power capabilities solely to utilize its slow-speed drawbar pull. Meanwhile, however, a few railroads (including Nickel Plate, St. Louis Southwestern, Santa Fe, and Union Pacific) were relying more on speed than on tonnage to give themselves better operating statistics while supplying better service to their shippers.

Rio Grande 3601 pounds upgrade at 10 mph, emerging from the Deen Tunnel, east of Minturn, Colo., on the Tennessee Pass route, with 58 cars and two helpers on March 30, 1946. R. H. Kindig

DEPRESSION DOLDRUMS

The stock market crash in late 1929 and the business depression that followed brought further development of big locomotives to a virtual halt. In 1930, Southern Pacific received the most noteworthy of its cab-in-front 4-8-8-2s. It had 139 square feet of grate area and 250 psi pressure. When the cab-forwards were used in passenger service over difficult profiles at high speeds, their performance was magnificent, yet their primary use was in low-speed freight service, three or four to a train, operating well below the capacity of boiler and machinery.

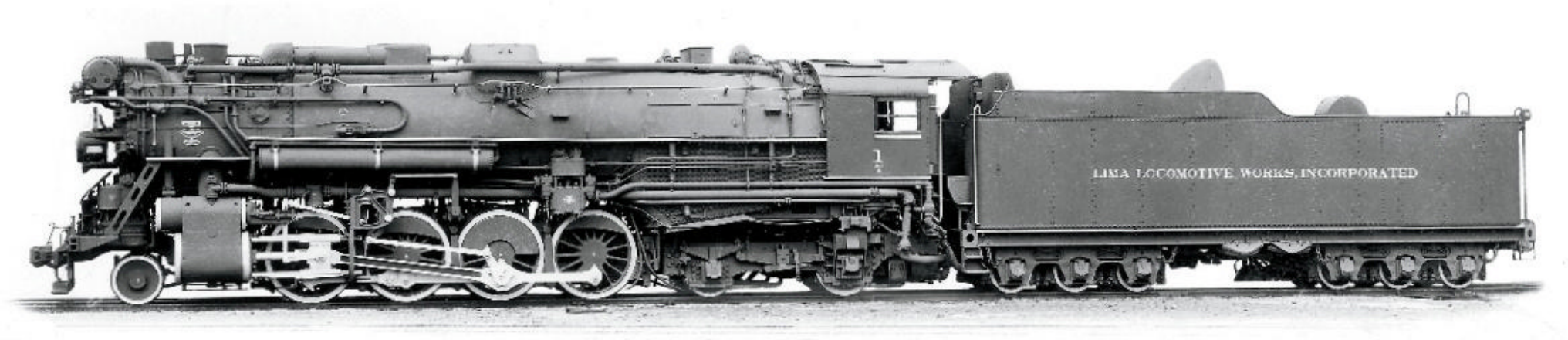
Chesapeake & Ohio acquired its first "big engine" that same year — a Lima-built 2-10-4 which completely surpassed the road's own simple 2-8-8-2s as well as all previous 2-10-4s. This was a stretched-out Erie 2-8-4 with 25% more drivers, 21% more grate area, and 6% more boiler pressure. Its principle of operation was identical to the Erie engine's — let the booster utilize the excess boiler capacity for low-speed acceleration, and develop all of the power in the main cylinders at running speeds.

CB&Q derived a remarkable 4-8-4 from its previous 2-10-4 by placing an almost identical boiler on new running gear. Its power-to-weight relationship was far ahead of any similar locomotive's at the time, and was later equaled by only a few.

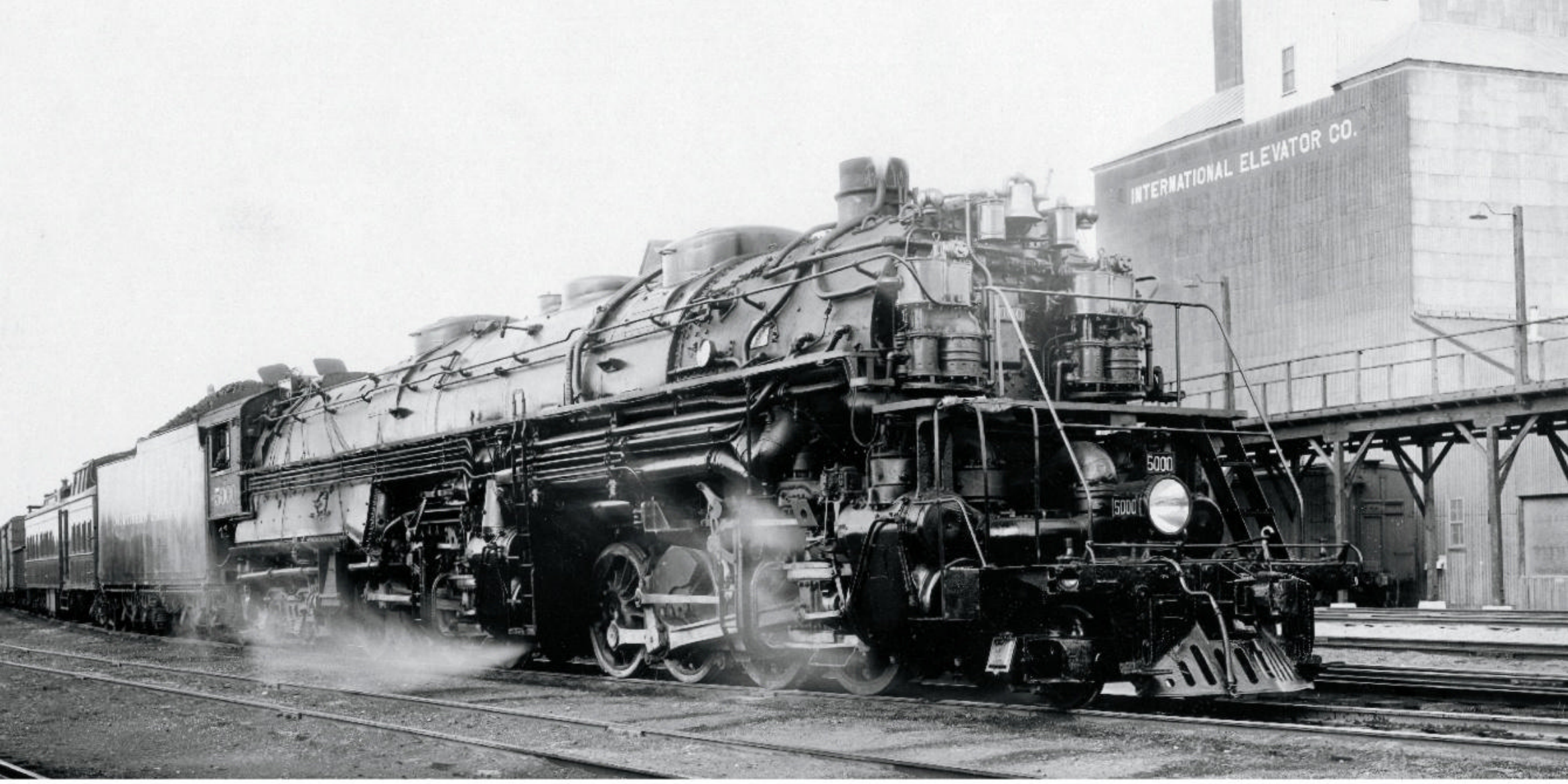
Delaware & Hudson developed yet another mighty 2-8-0. It was like its two predecessors except for its 500-psi boiler pressure. With an 82-square-foot grate, this monster possessed tremendous power capability; but once again, a promising locomotive was so loaded with tonnage that it could make but 5 to 10 mph on the ruling grades.

As the depression deepened, Western Pacific bought some 2-8-8-2s which improved on the D&RGW models by enlarging the grate area to 145 square feet and raising the boiler pressure to 250 psi while retaining the same driver and cylinder dimensions. Then, with the addition of a booster, this 2-8-8-2 became a low-speed powerhouse, bettering the Rio Grande's power-to-weight ratio by about 20%.

Despite these improvements in locomotive



Building on the success of Michigan Central 2-8-2 8000, an earlier demonstration of "Super-Power" concepts, Lima subsequently developed a bigger boiler and firebox. The added weight required a four-wheel trailing truck, and so the 2-8-4 was born. Lima's A-1 tested on several railroads. Lima Locomotive Works



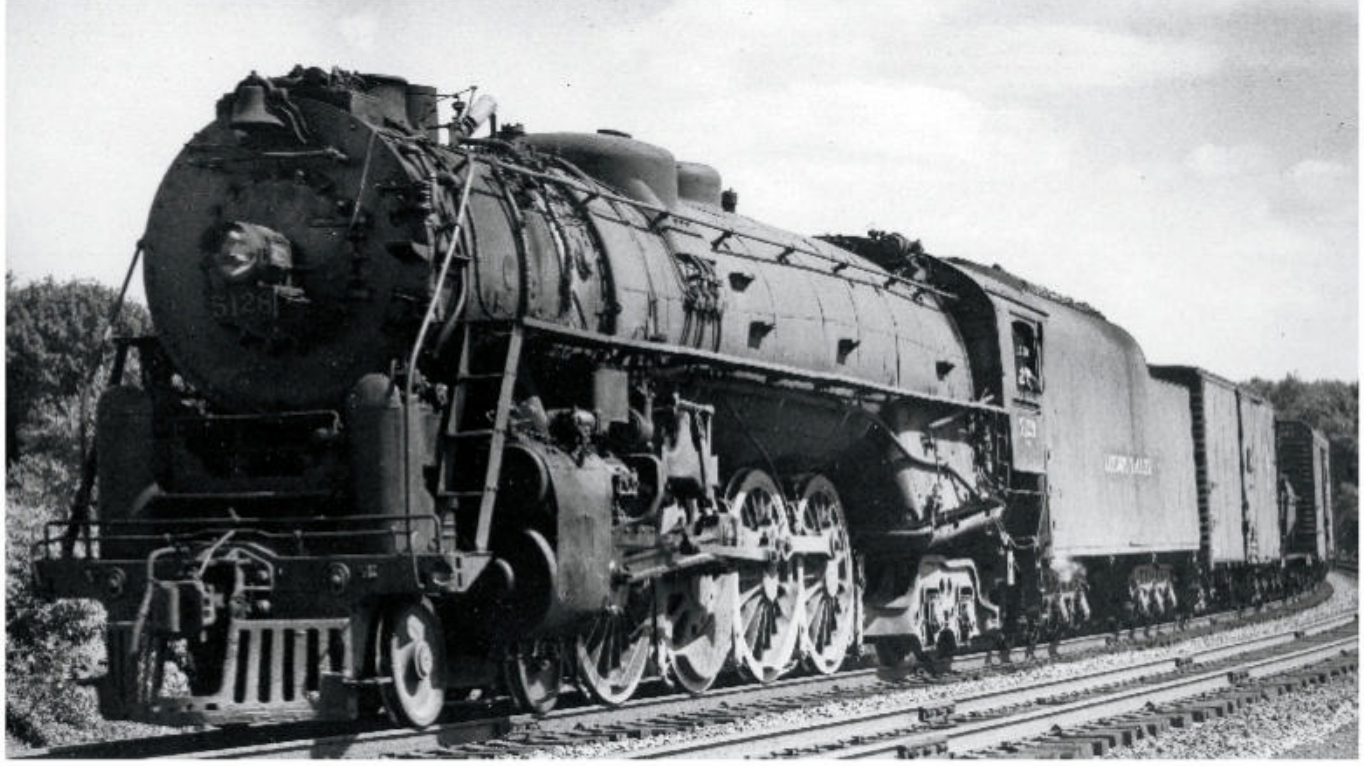
Northern Pacific 2-8-8-4 5000 steams at Glendive, Mont. The first of the Yellowstone type was built by Alco in 1928. It weighed 717,000 pounds and its auxiliary appliances included a trailing truck booster and two Coffin feedwater heaters. The road followed up with 11 more from Baldwin in 1930. All were classed Z-5. NP

performance, the financial stringencies of the depression had turned the thoughts of managements to saving fuel. New York Central and Canadian Pacific, inspired by European developments, sought economy by generating steam at extraordinarily high pressures. An internal system produced steam at 1,350 psi, with three cylinders using it at 850 and 250 psi. American built a single such 4-8-4 for NYC in 1931, and the CP's own shops constructed a similar 2-10-4. If the performance and fuel economy of these locomotives were outstanding, the maintenance of their complicated power plants must have consumed whatever savings had been attained elsewhere. They weren't duplicated.

In 1933 Baltimore & Ohio entered the big-performance/minimum-fuel/least-maintenance competition with a watertube-firebox 4-6-4 rebuilt from an ordinary 4-6-2. With 88 square feet of grate and 350 psi pressure, the locomotive possessed a boiler capacity exceeding that of all other three-driving-axle machines and almost all four-axle ones. Since its performance does not appear to have been noteworthy, we may presume that its machinery could not fully utilize the boiler's output. (Later, B&O produced three similar 4-6-4s, none of which performed much better than this first one.)

While B&O was trying to improve its passenger power, D&H made a final attempt to squeeze the last possible Btu from a ton of coal by ordering an Alco-built triple-expansion, four-cylinder 4-8-0 with a boiler pressure of 500 psi. This locomotive established new high marks for thermal efficiency, low-speed power, unavailability, and repair costs, and was eventually sidetracked for less complicated and more reliable locomotives. This final venture into the realm of high-pressure steam brought down the curtain on a decade of unremunerative experimentation.

In 1934, the end of the early-1930s depression, Baldwin built some 4-8-4s for Lehigh Valley and Northern Pacific which demonstrated the general level of design excellence at the time. The NP locomotive, designed to burn low-grade coal, was given a spacious grate of 115 square feet; the grate on the LV engine was only 97 square feet. Pressures were 260 and 275 psi respectively. Otherwise, the engines were constructed so that their power capabilities per ton of weight were almost identical. The C&O's best 4-8-4s, built by Lima a year later, had slightly less power capability than either the NP or LV engine at higher speeds, but the C&O 4-8-4's smaller drivers gave it improved performance during acceleration through the lower speed range.



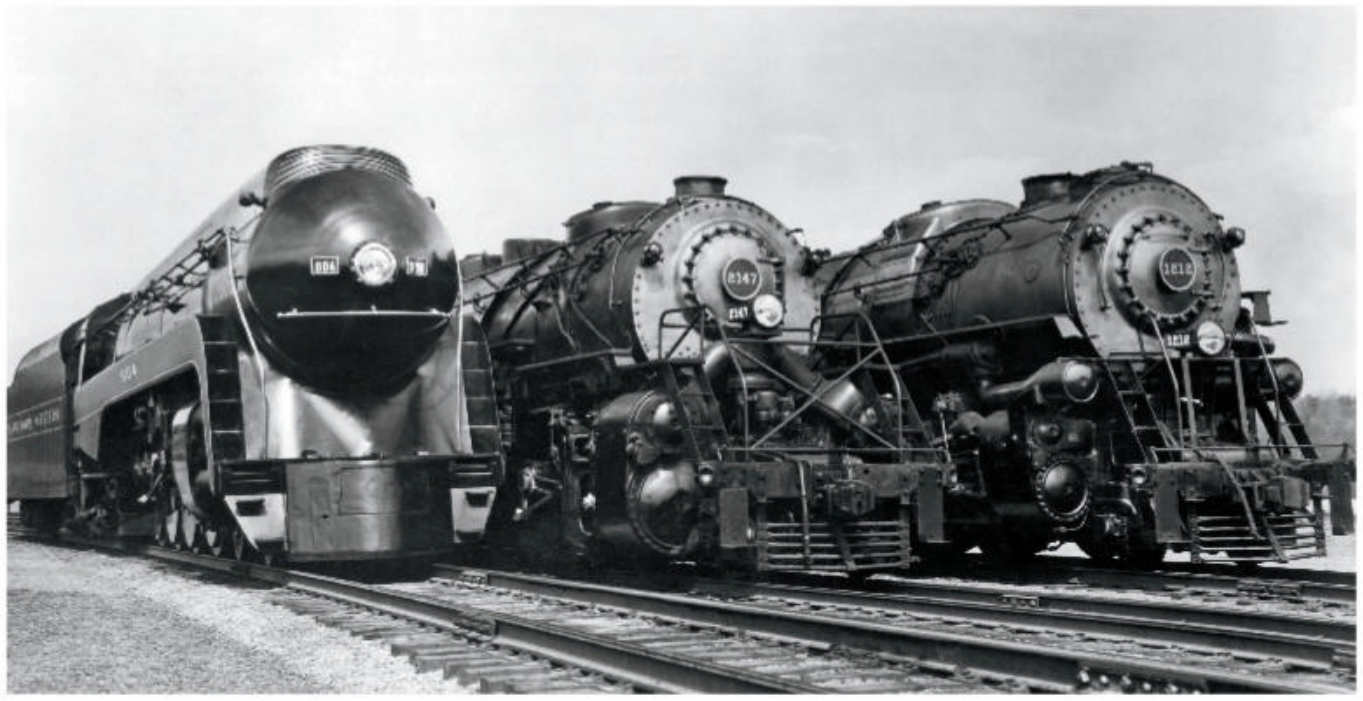
Lehigh Valley T-3 4-8-4 leads a westbound freight near Neshanic, N.J. The road had 37 Northerns, with five, Nos. 5125-5129, in the T-3 class, built by Baldwin 1934-35 and retired in 1951. W. R. Osborne

RADICAL NEW CONCEPT

In 1936, big-performance/big-power locomotives appeared in the form of a radical new concept in machinery design. Six driving axles were split into two groups of three; each group was connected to its own set of simple cylinders, the forward group being articulated. Three examples of this approach, pioneered by two disappointing B&O 2-6-6-2s constructed in 1930, demonstrated the divergence in boiler designs, even though all were equally excellent in actual service. The Norfolk & Western 2-6-6-4 carried its firebox, with 122 square feet of grates, entirely behind the drivers, thus giving ample combustion volume for good heat release. The Northern Pacific 4-6-6-4's 152-square-foot grate was entirely above the drivers to permit the burning of large quantities of low-grade coal, and the firebox was lengthened to give considerably greater direct heating area. Spokane, Portland & Seattle received some engines that were identical except for being oil burners. If either of these last two locomotives had been fired with good coal, they could have delivered more ton-miles per train-hour than any other steam locomotive ever built, excepting only the earlier NP 2-8-8-4, the later UP 4-8-8-4, and PRR's 6-4-4-6 and 4-4-6-4 engines. In total power capability, as well as in power capability per ton of locomotive, the NP-SP&S and N&W examples were exceptional machines. The N&W's 2-8-8-2 compound of this same year pushed boiler pressure to the 300-psi mark, while its smaller drivers, less spacious grate area, and greater weight than the 2-6-6-4 endowed it with tremendous abilities at the lower speeds.

The year 1937 represents the high-water mark of steam locomotive development and construction. During the previous two decades, power-producing capabilities had doubled; of vastly greater significance was the fact that power per ton of locomotive weight had also virtually doubled. One specific example is revealed by comparing the latest Santa Fe 4-6-4 (300 psi pressure, 99 square feet of grate, 412,000 pounds total weight) with Illinois Central's 4-6-4 conversion from a Lima 2-8-4 (265 psi, 100 square feet of grate, 406,000 pounds total weight).

Three other contemporary locomotives provide further insight into this amazing progress. Although each engine possessed the same number of axles, the arrangement of the propulsion machinery differed, resulting in divergent speed-power characteristics. Kansas City Southern's 2-10-4 carried 310 psi pressure, while its cylinders and 70-inch drivers developed maximum power between 30 and 40 mph. D&RGW's last 4-8-4s had an equal grate area, but carried 285 psi pressure. Their 73-inch drivers and smaller cylinders thus concentrated their power in the 35 to 50 mph range. Always experimenting, B&O constructed a 4-4-4-4 with a 350-psi watertube-firebox boiler. This rigid-frame, divided-machinery arrangement permitted lighter moving parts, but the reversed rear engine restricted the grate area to 81 square feet, which adversely affected the locomotive's power output at all speeds.

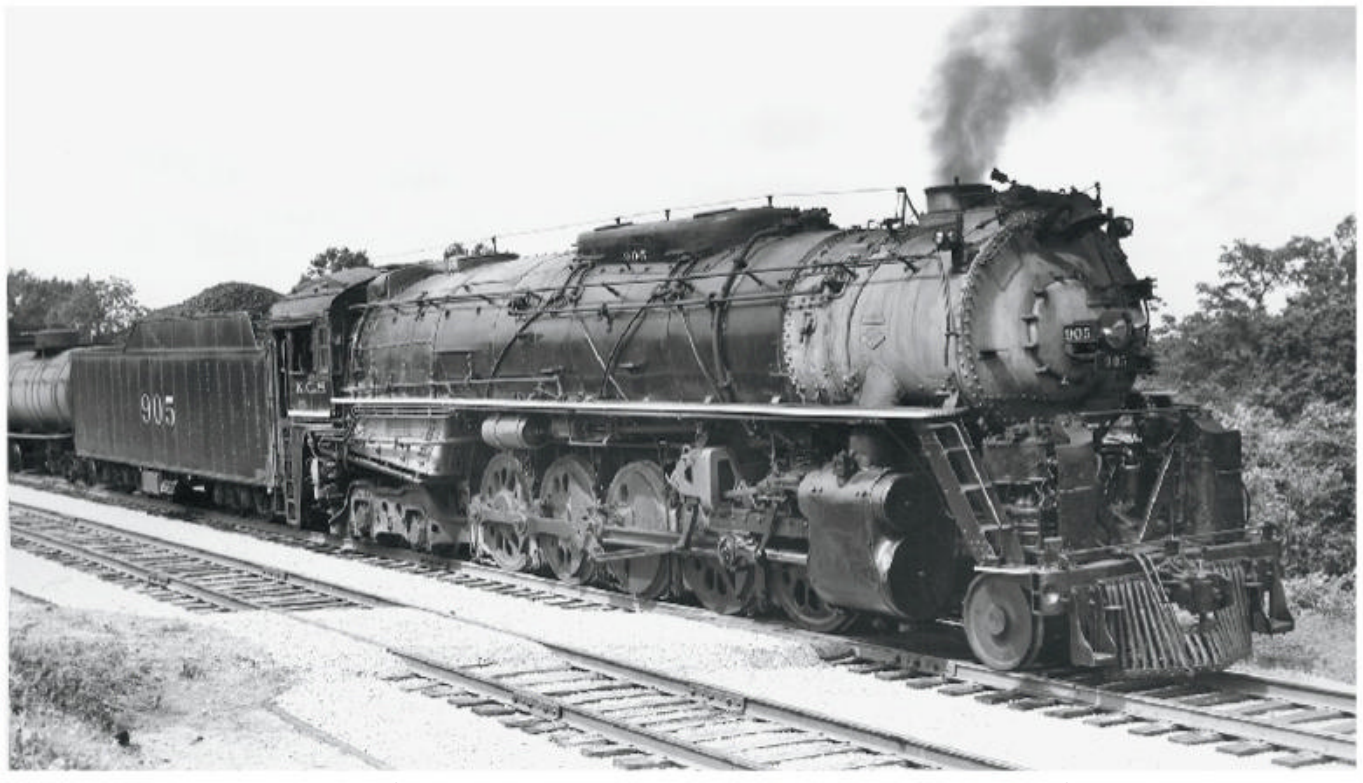


The Magnificent Three: Norfolk & Western J Class 4-8-4 No. 604, Y-6 Class 2-8-8-2 No. 2147, and A Class 2-6-6-4 No. 1212 in repose at Roanoke in April 1943. Norfolk & Western

SIGNS OF DETERIORATION

Despite the production of some outstanding engines in 1938, signs of design deterioration were evident, and this trend was to continue until the last steam plans came out of the drafting rooms. The reason for this reversal is obscure. All three major builders had demonstrated that they could design and build outstanding locomotives, and any railroad could have purchased duplicates of these eminently successful machines. Yet they rarely did so, and many of them acquired engines with much lower boiler pressures and much heavier engine weights than those then being erected. Whether this was due to the personal preferences of mechanical departments or to the experiences of individual railroads cannot be determined; nevertheless, a great disparity existed among the various kinds of big engines. Perhaps the two most disappointing designs were the WP and D&RGW 4-6-6-4s, for both were quite heavy and had relatively low boiler pressures. The Rio Grande locomotive was by far the better one by virtue of its enormous grate area: 137 square feet. If its boiler had been designed to carry 300 psi, it could have challenged the top-ranking locomotives in pure power output. Still, it was a successful design.

The Atlantic Coast Line's only big engine was a contemporary 4-8-4 which was quite average. It was outranked by the Milwaukee Road's version, which had 285 psi and a 107-square-foot grate area that placed it second only to the bigger Santa Fe design. This latter example of perfection in locomotive de-



KCS's J class 2-10-4s, exemplified by 905, were based on Lima's T-1 class 2-10-4s for C&O and worked over Rich Mountain. No. 905 once carried a war bonds advertisement on its tender. Classic Trains collection

A C&O eastbound coal drag pounds up the Allegheny grade at a steady clip past WS Cabin near White Sulphur Springs, W.Va., behind H-8 2-6-6-6 1618 in 1953. Lima built 60 for the road 1941-48. Parker Hayden

sign showed what could be done with 310 psi pressure, 108-square-foot grates, and 80-inch drivers. In all-around characteristics —performance as well as economy — no better eight-driver locomotive was ever built.

But the Santa Fe was not content with having the "biggest and best" 4-6-4 and 4-8-4 types. The road won another crown with its incredible 2-10-4, which boasted 122 square feet of grate area, 310-psi boiler pressure, and 74-inch drivers. It was far ahead of any 10-driver rival, and was matched in power only by PRR's 4-4-6-4. No other engine of any kind, except its companion 4-6-4 and 4-8-4 types, came near to equaling its power capabilities per ton of weight. Among non-articulated locomotives, only PRR's 4-4-6-4 and 6-4-4-6 with larger grate and greater weight exceeded Santa Fe's 2-10-4 in power output.

The Milwaukee Road and North Western 4-6-4s also deserve some mention, for both were very close to the AT&SF 4-6-4 in dimensions, although they had slightly less grate area. These three 84-inch-drivered designs stood above all others in the matter of power at high speeds, and it is safe to say that any of them could have set unassailable speed records.

PRR'S HIGH-SPEED MONSTER

In 1939 PRR startled the railroad world with its revolutionary 6-4-4-6 duplex designed by Alco, Baldwin, and Lima working with the railroad's staff. Its 300-psi pressure and 132-square-foot grates endowed it with the power capabilities of the NP 4-6-6-4s, while its Belpaire firebox enabled it to generate more "boiler power" than any other locomotive built. This enormous supply of high-pressure steam allowed it to develop more power than any other engine before or after,

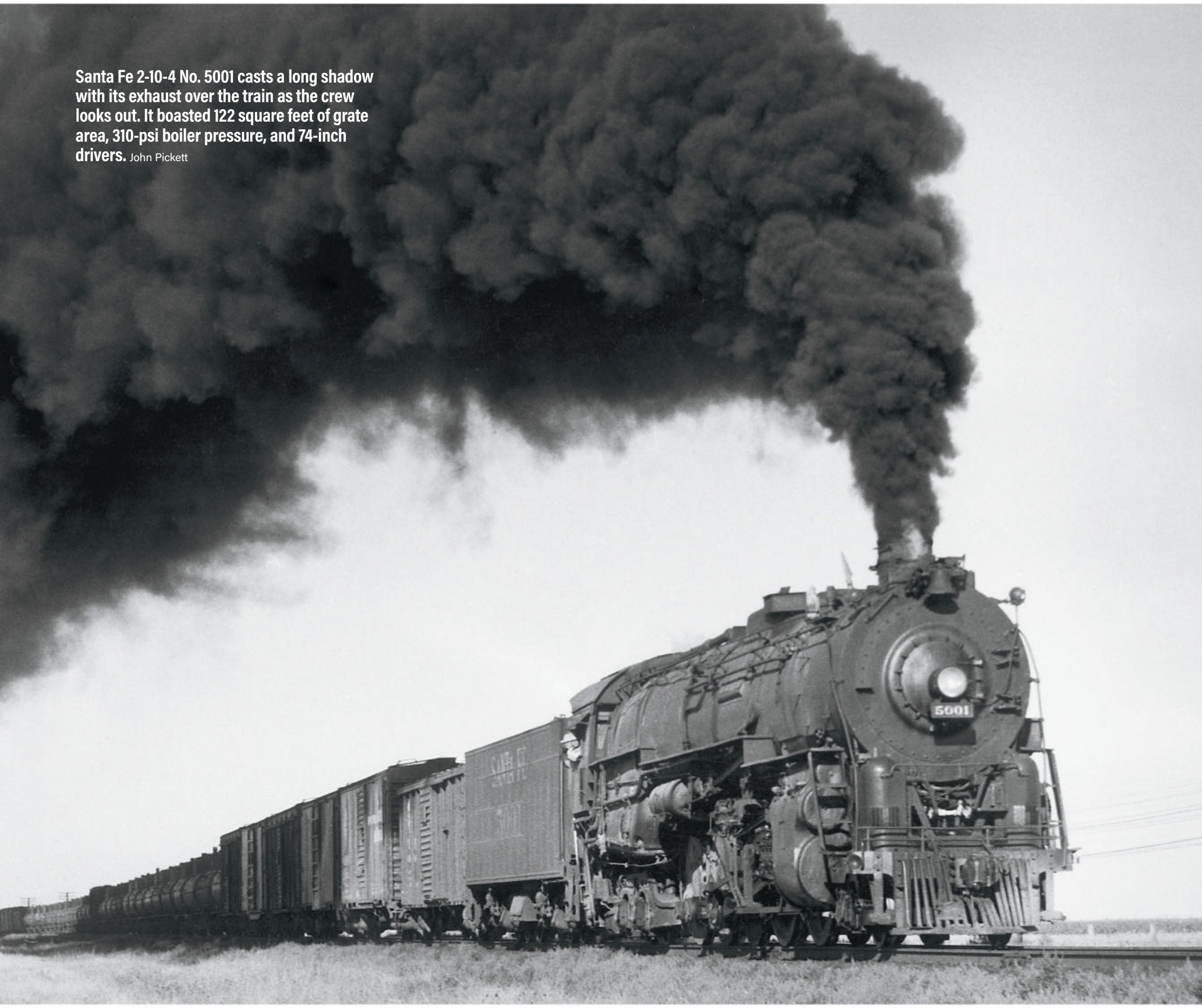
The Pennsy's revolutionary streamlined 6-4-4-6 duplex, No. 6100, was designed by Alco, Baldwin, and Lima working with the railroad's staff. Its 300-psi pressure and 132-square feet of grates endowed it with the power capabilities of the NP 4-6-6-4s. It would remain, however, one of a kind. PRR

and no one knew its ultimate capabilities. It was, however, suitable only for fast passenger service. By comparison, the NP 2-8-8-4 was a drag engine, while the later UP 4-8-8-4 fit neatly between these two extremes.

Two other big engine designs appeared in 1939 — a Southern Pacific 2-8-8-4, which was merely the road's 10-year-old cab-in-front with the tender normally oriented, and a UP 4-8-4 which was similar to the Santa Fe's equivalent, but with a smaller grate area. The UP locomotive was a member of the same exceptional group as the D&RGW, Milwaukee, and NP-SP&S 4-8-4s.

The decline in perfection, if that is the term, was clearly evident in 1940. Western Maryland and D&H 4-6-6-4s were abnormally heavy for their power, and their grates were unusually small (119 and 108 square feet respectively). In these respects they were no better than locomotives built a decade earlier. In fact, GN's rebuilt 2-8-8-0s, with 275 psi and simple cylinders, were perhaps better suited to the task at speeds under 30 mph.

The following year, 1941, was another one characterized by great contrasts in design accomplishments. SP's 4-8-4s fell shy of their greater predecessors, though the N&W 4-8-4 almost equaled the Santa Fe model. Alco and Union Pacific produced a record-breaking 4-8-8-4 with 300 psi pressure and 150 square feet of grate. Burning superior coal, it could run away with a train that the NP 2-8-8-4 could only drag; and unlike other 16-driver engines, it could make good over-the-road time with whatever it could get moving. Its evaporative abilities may not have matched those of PRR's 6-4-4-6, but its cylinders and drivers delivered the power at the speeds that meant most to the UP. On a power-to-weight basis, it was the equal of modern 4-8-4s, no mean accomplishment in such a large locomotive.



Santa Fe 2-10-4 No. 5001 casts a long shadow with its exhaust over the train as the crew looks out. It boasted 122 square feet of grate area, 310-psi boiler pressure, and 74-inch drivers. John Pickett

Steam report card

Atchison, Topeka & Santa Fe: AT&SF was the uncontested leader in three-, four-, and five-driving-axle locomotives of conventional design. Its 4-6-4, 4-8-4, and 2-10-4 designs possessed more potential power than any others. Only a few unconventional locomotives could have surpassed them, and they were used to the limit of their capabilities.

Baltimore & Ohio: The 4-6-4s, with high-pressure watertube-firebox boilers, appeared capable of outstanding performances. Possibly they did not operate at speeds high enough to demonstrate what they could do. The 4-4-4-4 was handicapped by a grate which was too small for such a large locomotive.

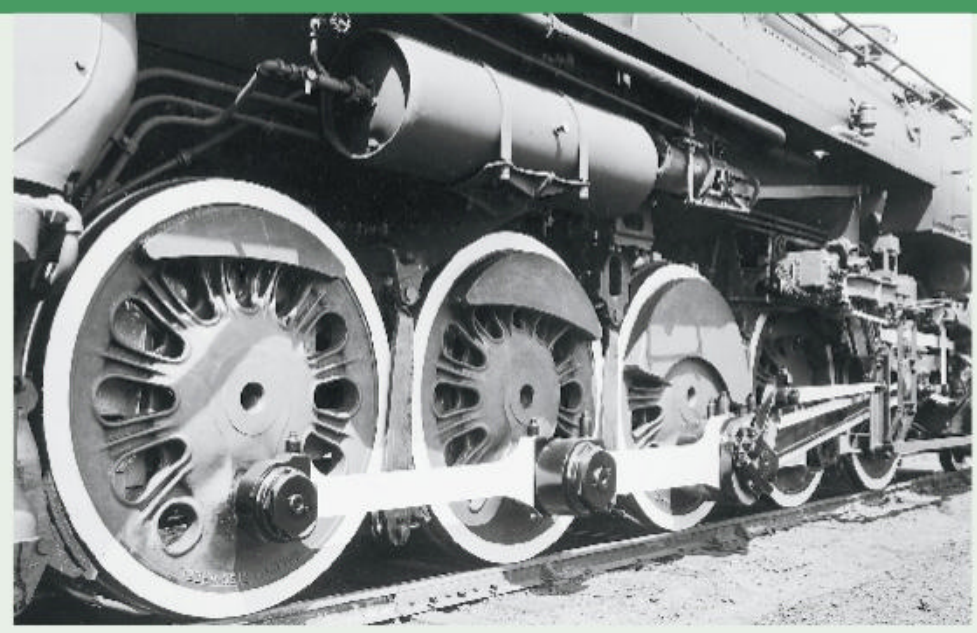
Chesapeake & Ohio: The 2-6-6-6 was much too heavy for its power potential, which was largely unused because operating speeds were low. Even though its dimensions show the 2-6-6-6 to be admirably suited for manifest service over a severe profile, its primary function was to haul coal drags. The 2-10-4 and 4-8-4 designs were good but not outstanding.

Delaware & Hudson: Maximum thermal efficiency and power potential per ton of locomotive weight characterize the experimental high-pressure watertube-firebox designs. Unfortunately, these locomotives were so loaded with tonnage that they could rarely reach speeds at which their steam-producing abilities, could be utilized to maximum advantage.

Denver & Rio Grande Western: D&RGW's 4-8-4, 4-6-6-4, and 2-8-8-2 locomotives were among the most powerful of their types. Their dimensions and proportions were admirably suited to service requirements.

Erie: The Triplex was an example of the maximum-tonnage/minimum-speed philosophy, the exact opposite of the thinking behind the road's 2-8-4.

Norfolk & Western: No eastern carrier surpassed this railroad in the design and operation of high-power steam locomotives. Its 4-8-4 was within a whisker of the Santa Fe's engine; its 2-6-6-4 was the equivalent of Union Pacific's 4-6-6-4; and its compound 2-8-8-2 was the equal of Rio Grande's simple counterpart. N&W matched the engine to the job too, establishing ton-mile-per-hour records at minimum costs.



A Santa Fe 2-10-4 shows off its running gear. The railroad was known for big, conventional locomotives capable of producing more potential power than any others of similar design. Baldwin

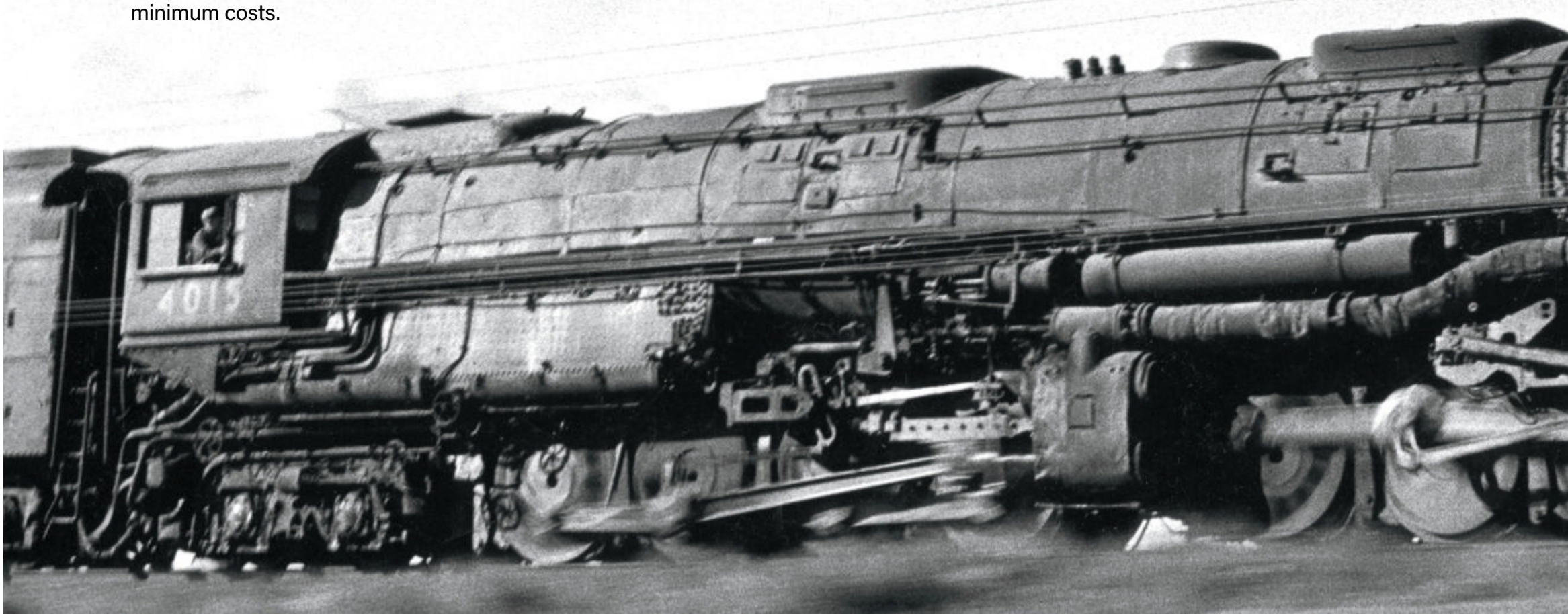
Northern Pacific-Spokane, Portland & Seattle: If the 4-8-4s, 4-6-6-4s, and 2-8-8-4s could have burned good coal and operated at substantially higher speeds, they would have given magnificent performances. Their dimensions were exceptional, and it is unfortunate that their capabilities were not realized in service.

Pennsylvania: After a long period of standardization lethargy following its 2-8-8-0, Pennsy turned out revolutionary designs of 6-4-4-6, 4-4-4-4, and 4-4-6-4. types. Failure to exploit earlier the features of these advanced concepts is regrettable.

Union Pacific: Although they possessed slightly less power potential than similar NP locomotives, UP's 4-8-4, 4-6-6-4, and 4-8-8-4 engines — burning good coal and operating at high speeds — no doubt delivered superior performance both over the road and on the account books. Again, locomotive and service were closely matched for maximum results.

Virginian: VGN's locomotives, whether steam or electrics, produced maximum tonnage at minimum speed.

Western Maryland: Except for mechanical refinements which reduced repair costs, the road's overweight 4-8-4s and 4-6-6-4s (1947 and '40) were undistinguished in comparison with the very light (weight per horsepower) 2-10-0 built in 1927.



At the other end of the scale were two tremendous designs whose power-to-weight relationships were more like those encountered at the beginning of the Super-Power era. The reason was obvious: both Duluth, Missabe & Iron Range (2-8-8-4) and Chesapeake & Ohio (2-6-6-6) were tonnage-oriented carriers. Neither company seemed to recognize that the high-capacity steam locomotive delivered the most ton-miles per train-hour at speeds close to that corresponding with maximum power output. This may have made little difference to the captive DM&IR, but understanding the C&O's attitude is difficult. DM&IR dragged immense loads of iron ore from the mines to the docks, while the C&O used its massive Allegheny types on coal drags, well below their maximum abilities.

DAY OF THE DUPLEX

The onset of World War II found PRR searching desperately for passenger and freight locomotives to supersede its fleet of aged 4-6-2s and 4-8-2s. While other lines had embraced the booster as a means of utilizing excess boiler capacity at low speeds, and the four-wheel trailing truck had permitted much larger grate areas to produce more power at higher speeds, PRR had shied away from both.

Building on its experimental 6-4-4-6, Pennsy tried 4-4-4-4 duplexes for passenger work. Although they were excellent locomotives, they were not substantially better performers than a well-designed 4-8-4. An experimental 4-6-4-4 freight-hauler with the second set of cylinders at the rear was handicapped by an inadequate 98-square-foot grate area, despite 300-psi boiler pressure. Pending the outcome of further experimentation, the road was obliged to take 2-10-4s based on the C&O's low-speed design rather than on Santa Fe's high-speed version.

While PRR was writhing in this thermodynamic spasm, UP in 1942 acquired the best of its fine 4-6-6-4s. With 280 psi pressure, 132-square-foot grates, and using good coal, they stood at the pinnacle of 12-driver achievement, outperforming the NP-SP&S 4-6-6-4s in service. Furthermore, like the Santa Fe and unlike many other roads which misapplied their high-power engines, UP held down tonnages, allowing its locomotives to run at high speeds and thus deriving from them the most work in the least time at the lowest cost. The financial records of these carriers are convincing evidence of their unorthodox operational philosophy.

World War II did nothing but harm to the new designs or duplications, since the use of high-strength alloy steels was restricted. Clinchfield's 1943 4-6-6-4s, patterned after the D&H design, were heavier and less powerful than the originals. Missouri Pacific fared better with an almost exact copy of D&RGW's 4-8-4, and D&H managed to get some tolerably good 4-8-4s with 285 psi boilers and 96 square feet of grate area. In general, though, the trend indicated that big power was becoming less big — particularly in power capability — while their weights were becoming greater. This could mean only one thing: railroads wanted locomotives that would develop greater drawbar pull and power at lower speeds. One could conclude that speed in freight service was something they did not want.

The decline continued into 1944. B&O's 2-8-8-4 had only 235 psi pressure with 118 square feet of grate and a 629,000-pound engine weight. Contrasting sharply was PRR's new 4-4-6-4 with 300 psi and a 122-square-foot firebox. It weighed 619,000 pounds, was all muscle, and stood second only to Santa Fe's 2-10-4s in power potential. Very probably, however, it surpassed the 2-10-4 in road performance; its Belpaire firebox possessed a 25 edge in steam-generating ability over a conventional one, and it most likely outperformed the NP-SP&S 4-6-6-4s too. It even narrowed the gap that separated the NP and UP 16-driver monsters from all contenders, and only a detailed analysis of test records could reveal just how close it came to matching their capabilities. Apparently the 4-4-6-4s were not what the Pennsylvania wanted, however, for only 25 were constructed.

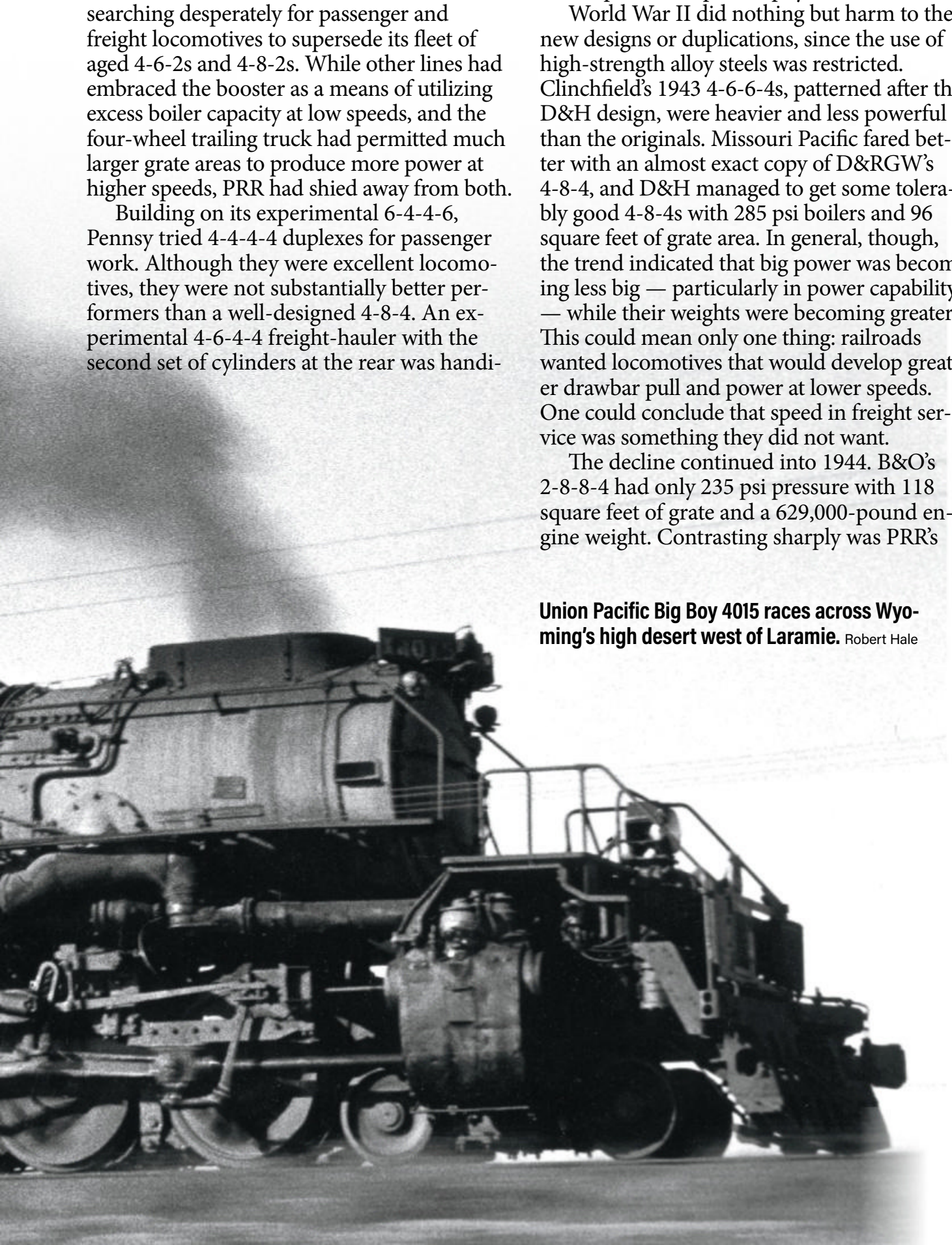
Toward the end of the war, New York Central received a highly refined, extraordinarily compact 4-8-4. No similar engine had so much power squeezed into such tight clearance limits. The Virginian copied C&O's massive 2-6-6-6 for itself, placing them in low-speed coal-drag service where their power could not be fully utilized. Evidently the proposition of hauling 50% more tonnage at half the speed was more attractive to the coal-haulers. The only big engine of 1946 was a lackluster 4-8-4 for the Rock Island; Western Maryland's 4-8-4 of 1947 was no better. These last new designs were barely more advanced than those devised 20 years earlier, considering power capability and power per ton of engine weight.

HOW DID STEAM LOSE OUT?

In view of the superlative performance and economies of the best steam locomotives, as indicated by these features of the biggest ones, we may wonder how the diesel-electric managed to replace steam. How, for example, could a 1,350-h.p. diesel unit do what a 4-8-4 had done? The answer is straightforward and is distilled in a comment on Pennsy's 4-4-4-4s by Baldwin's chief engineer: "These locomotives will outperform a [four-unit] 5,400-horsepower diesel locomotive at all speeds above 26 miles per hour."

With freight-train speeds averaging 16 mph at the time, who wanted a locomotive that developed maximum power at two or three times that speed? Even at manifest speeds, two B-B diesel-electrics could match many a 4-8-4 and equal a 2-8-8-2 in starting and accelerating ability. Hence diesel-electrics, by combining in multiple, could produce any desired power level at all speeds instead of only one speed. This was exactly what most railroads wanted — a locomotive that would deliver as many ton-miles per train-hour at low speeds as it could at high speeds. The Virginian's Triplex dream had finally become a reality.

ROBERT A. LE MASSENA was a prolific rail author, particularly on steam locomotive subjects. He wrote several books and more than 35 articles in Trains. He died in 2013 at age 99.



Union Pacific Big Boy 4015 races across Wyoming's high desert west of Laramie. Robert Hale

CHICAGO & NORTH WESTERN **Bell ringing and whistle blowing on July 23, 1933, C&NW class D 4-4-2 No. 1446 brings Chicago–Freeport, Ill., train 711 into the deserted station at Wayne. The North Western acquired 91 of the high-drivered Atlantics for top-rank passenger work between 1900 and 1908. The appearance of the first class E Pacifics in 1909 saw the Ds downgraded to lesser duties such as this leisurely local. The last one was retired in late 1954; the lone survivor is at the Museum of Transportation in St. Louis.** A. W. Johnson, Krambles-Peterson Archive collection

BOSTON & MAINE The first 4-4-2s emerged in the late 1880s, but it wasn't until 1894, when Baldwin built one for the Atlantic Coast Line, that the wheel arrangement got its name. The Atlantic became the preferred type for premium passenger trains on many roads before the advent of steel cars in the late 1900s rendered the 4-4-2 too light for such service. During the brief heyday of the Atlantic type, Boston & Maine 845 stands amid dirty snow with elderly 0-4-0 and 4-4-0 types. Thomas L. DeFazio collection

FROM
MAY
1948
TRAINS
MAGAZINE

RIGHT-HAND

THREE TRIPS ON THE SOUTHERN PACIFIC DEMONSTRATE HOW THE ENGINEER IS THE KEY MAN OF ANY TRAIN CREW

You are on the right-hand seatbox in the cab of the second section of Southern Pacific train 26 in Roseville, Calif. Second 26 is a hotshot grape train composed of passenger-service refrigerator cars marshaled from the vineyards of California's San Joaquin Valley. A passenger coach serves as a caboose. That number "26" means you're running as the second section of the *Fast Mail*.

Across the operator's desk at Norden, 85 miles east and the 6,871-foot summit of SP's line over the Sierras, lie several copies of the dispatcher's 6 a.m. lineup. Bridge-and-building crews, section foremen, signal maintainers on gas cars — all need a copy of the lineup. This morning it contains the following information:

Second 26, Express Special. Do not delay. Lv Roseville 8:15 a.m., Colfax 9:15 a.m., Emigrant Gap 10:25 a.m., Norden 11:11 a.m., Truckee 11:41 a.m. This train must not be delayed. Future biz depends on this train. This is a test run. Grape or fruit business competition.

This is only a tentative schedule, faster to Norden than even the *San Francisco Overland*, but it gives you something to shoot for — and sitting up there on a big 4200-series cab-in-fronter, you are "it"!

The huge throttle hangs above you on its quadrant. The stubby air-powered reverse lever is on another quadrant at your knee level and a bit to your left. The automatic and independent brake handles are also to your left. And you have two whistle valves, one to operate a diesel-style air horn, one for the steam whistle. There are sander valves, which you'll use if the drivers need more traction. There are two air-brake gauges. There is a steam gauge, and a Loco Valve-Pilot gauge which includes a speedometer.

Soon after departure, you're pounding upgrade. Into snowsheds and tunnels you plunge, twisting over mountain rails where 35 mph is fast. You're in a cab-ahead, remember, where the smokestack is behind you and your view of signals inside snowsheds is unobstructed. And you're sitting amid all these gadgets on the right-hand side of one of the world's most powerful engines, crossing one of the world's toughest pieces of mountain railroad, because you've had the necessary experi-

Extra 4200 leaves Roseville, Calif., for a climb over the Sierras. All the smoke and steam exhaust gives the impression that a heavy train must be in tow. Classic Trains collection

MAN in the cab

By **Howard W. Bull**

Illuminated by the setting sun, an eastbound freight steadily eats up the grade between Emigrant Gap and Crystal Lake. Jim Morley

ence to make you the key man of the crew. You know the engine, the train, the grade, where to look for signals, how to use the air, and a hundred other things.

Remember that dope sheet, the one the dispatcher issued to the operator at Norden? He'd planned on getting Second 26 out of Roseville at 8:15 a.m. Actually you left at 8:20. Now you're poking into the snowshed-covered interlocking plant at Norden, up past the little concrete depot where all the levers are, and finally you bring her to a stop with the coach caboose just past the interlocker at 11:23.

You were due, on that tentative schedule, at 11:11. You're 12 minutes late, laid out by a section gang that should have been in the clear. But you left your terminal 5 minutes late, so you're really only about 7 minutes to the bad. Maybe you can pick it up going down the east side of the hill.

The brakemen set up the retainers on the cars before you start down. "Setting up retainers" means turning up valves at the ends of all cars so as to retain some of the effect of each brake application. This allows you to recharge the brake cylinders with air, an operation which must be done with the brake valve in the release position.

Down the hill you start, and even inside those cathedral-like snowsheds you know just where to look for signals, just when and where to make an application of the train brakes, how much air to draw off and, more important, how long it takes to put that air back into the reservoirs. Right now, with Second 26, you're over the hump and making the running air test. The rear man is signaling five on the cab communicating signal, saying, "OK, brakes are working; let's go."

There are speed restrictions down the mountain, yet you make good time because you have done it before. You've read all about it, but it takes more than reading to do this job. You have actually handled trains, long heavy ones, short light ones, local freights, work trains, fast passengers. That's why you scarcely look at your air gauges as you finger that stubby brass handle that brakes hundreds — or thousands — of tons of weight down the mountain.

You have developed a sort of sixth sense; you have acquired the feel of it through experience. The conductor is officially the boss of the train, but he isn't up front. You are! You're the guy who handles the train, who sees what's up ahead first and has to act on it, and in whose lap the railroad puts the responsibility. Yes, the engineer is the key man of the crew!

Second 26 is a first-class train, and it is allowed 35 mph on the straightaways and 30 on curves between Norden and Truckee. It is mostly curves, so you spend most of your time working the brake. If there is any one item with which any locomotive engineer is more concerned than any of the others, it is the air brake.

On your first application of brakes after leaving the summit, you make a mental note of the reduction in air pressure required to keep this particular train under control, and as you drop down the grade you know how much to draw off the next time and the next. What's more, timing is of utmost importance.

You return your brake valve handle to "lap" position after each reduction and keep it there momentarily. This action, similar to that of the retainers on the cars, also retains the application just made, allowing pressure throughout the train line to equalize and keep the brakes set long enough to steady the train. The principal difference is that the retainers on the cars retain a certain amount of each reduction as a brake application even after you have released brakes at your controls, while lap position on the brake handle retains the whole application, but only as long as the valve is left there. Now you must also put air back into those tanks beneath each car, and you do this by sliding the brake valve handle over to full release position for a while before returning it to full running position. This pumps air through the train line again, through the triple valves under the cars and into those auxiliary reservoirs, which of course have been only partially depleted by the previous brake application.

And while you're doing all this you are also using the independent, or engine, brake to keep just the right amount of brake-shoe pressure against the driving wheels. This is particularly important with a freight train running across the frequent "flats" where the downgrade levels off, because allowing the heavy 4-8-8-2 to run ahead, with brakes set on the cars, might break the train in two. Tire coolers spray water on the drivers to keep them from overheating.

Now let's have a look at some of the other gadgets surrounding you. Many people might think you close the throttle when going downgrade. In fact, you work a "drifting throttle," using just enough steam to prevent a vacuum from forming inside the cylinders. This protects the lubrication which is forced into those cylinders by mechanical feeds and which a vacuum, if allowed to exist very long, would destroy. A steam-chest and back-pressure gauge beside you will register slightly when working a drifting throttle, perhaps; but this is not its main function, and presently you'll meet it in full use.

In the meantime, your hotshot fruit express glides down off the steep back of the Sierras, past Donner Lake, through Truckee, and then along the Truckee River to Reno and Sparks, where the Sacramento Division ends and the Salt Lake Division begins.

HELPER OUT OF ROSEVILLE

That's the end of your run, but there's always another if you're in the "mountain pool." One of the best spots to see what the engineer faces when working the mountain is the cab of a Roseville-Norden helper, back near the caboose of a drag freight or a heavy fruit block. It isn't just 10 or 20 express reefers now; it's 70 loads of merchandise, oil, or fruit. If the train runs over a certain tonnage it may pick up another helper at Colfax, 30 miles east of Roseville, and keep this extra engine as far as Emigrant Gap. But instead of a 4-8-8-2, the Colfax helper will be a little Consolidation, with the cab back where it belongs and the smoke, in tunnels and sheds, exactly where it doesn't belong — in the cab and the enginemen's lungs. A little 2-8-0 will not ride like the big fellows, either.

But today you're aboard another big "Mallet," one of two cab-aheads which come out of Roseville as helpers. This heavy freight requires three 4-8-8-2s to lift it to Norden.

Novices wonder, "What sort of gear shift is on a locomotive?" The answer is, "The best on earth." But it's not a gear shift as automobile drivers know it. It has no gears to mesh or disengage. Rather, it's the "reverse" lever, and it is a sliding-scale device so variable in its speed and power range that it is measured by the slight movement between one notch and the next on a quadrant.

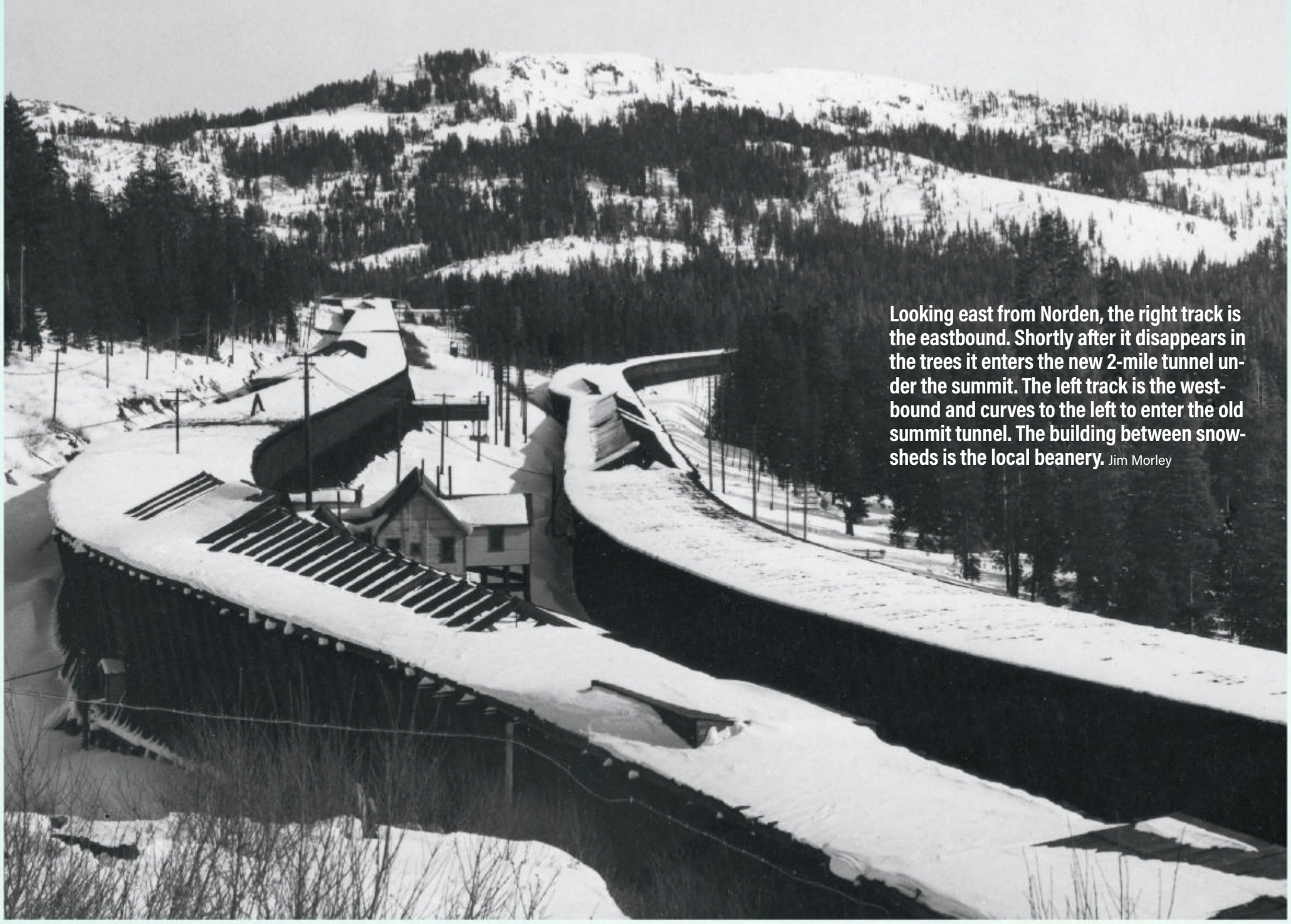
On modern locomotives this quadrant is a small affair, across which a short handle plays to engage its lock, or dog, in the teeth, or notches, of the quadrant. Engineers of yesteryear wrestled with a huge quadrant upon which a long heavy lever played — and sometimes played havoc with the man when he adjusted it from notch to notch, as it was manually operated and the engineer used his muscles to lift and lower the heavy valve gear mechanism. Compressed air does the work today, but the principle of steam distribution is the same.

"Neutral" is obtained when the reverse lever is standing straight up in the center of its quadrant. Moving it ahead gives various speed and power ranges for forward motion; moving it back provides the same variations in backward motion. To start out, you put the lever "in the corner" as far as it will go. On an automobile, this would be "low gear." The engine will now use the maximum amount of steam in its cylinders and during the maximum amount of its stroke.

Raising the reverse lever back toward center alters the valve-gear mechanism so as to reduce the amount and time of steam admission; but it also causes the locomotive to run faster and exert less power with the same amount of throttle. This does not necessarily imply that it will run faster up our grade. But to leave the lever down in the corner would be like leaving your car in low gear when a higher gear would do the job. And if you don't "hook her up" (move the reverse lever as high on the quadrant as possible and still achieve the necessary power output), your fireboy will have a tough time keeping up steam. On fast passenger runs, especially in flat territory, that little lever may be very close to center; then she's really "in high." But pulling or pushing freight uphill requires lower notches on the quadrant.

On this trip, you're on the rearmost helper, the third of three cab-ahead 4-8-8-2s. You are sandwiched in 5 cars ahead of the caboose, and your fellow helper engine is 11 cars ahead of you. Counting the road engine, that makes 12 cylinders of 250-psi steam hoisting your train over the Sierras.

As the grade gets steeper your fireman watches the water, carrying it close to the bottom of the glass, not the top as on a rear-cab engine, because the firebox and crown sheet are at the front, the highest point, going uphill. And you watch your steam-chest and back-pressure gauge. This modern apparatus tells you how much steam pressure you're working into the cylinders against the pistons, and how



Looking east from Norden, the right track is the eastbound. Shortly after it disappears in the trees it enters the new 2-mile tunnel under the summit. The left track is the westbound and curves to the left to enter the old summit tunnel. The building between snowsheds is the local beanery. Jim Morley

much back pressure is exerted against the pistons near the end of each stroke. Adjusting the reverse lever produces the right combination.

Then there's the Loco Valve-Pilot. This instrument incorporates a speedometer and a hand which registers the percentage of "cut-off," which means the time during the stroke of the piston that the steam is allowed to enter the cylinder. By getting the proper balance between throttle and reverse lever you can get the most out of the locomotive, and these gauges are put in the cab to guide you.

Pounding up an 85-mile grade, synchronization is needed among those three huge engines. If the one on the point slips badly, you'll feel it back here some 60 cars behind him. Maybe sand on the rail will save you long enough to allow the lead engineer to get hold of her again; maybe it won't and you'll have to drop your engine down a few notches and ease off on the throttle to keep from slipping yourself. But keep 'em rolling at all costs — any momentum is better than a dead stop.

CUTTING OFF AT NORDEN

And so the heavy freight tops the grade at Norden. The man on the point eases down and shuts off. The first helper crests the summit and follows suit; but you, in the second helper, work a fair amount of steam right past the interlocking office and for some distance into those winding snowsheds, so the slack between the cars won't run out. Now it's up to the lead engineer to bring 'em to a stop short of the derail on the shed-covered siding. Yes, freights at Norden are usually funneled into the passing track, there to lose their helpers.

Cutting out two helpers on a "three-bagger" is quite a procedure. Remember, you are on the siding, with the eastbound main right next to you. The whole layout is pretty much in the dark inside these sheds. Signals in here are all interlocked, as are the power-thrown switches, and you must know where to look for green, yellow, or red aspects among that maze of timbers. So the train stops and the "swing man" (middle brakeman) makes a cut just ahead of the lead helper; that leaves 11 cars, the rear helper, and 5 more cars plus the caboose behind him.

The engineer of the lead helper then backs the whole rear end of the train until he clears a crossover leading to the main line. Here the brakeman cuts off the engine; on signal it eases through to the main; and again on signal it reverses direction and backs west down the main around the rear of the train and your helper engine. It stops clear of the same siding switch your train used coming into Norden, and there awaits a yellow signal.

As soon as the first helper has crossed to the main line, clearing the siding, you move ahead, shoving the 11 cars which were between the two engines. The brakeman couples them to the forward portion of the train. But you have left the last 5 cars and the caboose standing behind you on the siding, and the other helper now comes up behind the caboose and couples to it. There he waits for a hand signal from the rear brakeman to shove the train together. He cannot do this, of course, until you have finished coupling up the 11 cars and have backed your engine to the turntable.

The turntable is right inside these snowsheds. It has four lead tracks, feeding into side track or main line as the case may be. The operator in the interlocker can route you in or out various ways, as traffic demands.

So you come back down the siding to the nearest turntable lead, just ahead of the standing 6 cars and the other helper. You find the switch lined, and you run into the clear, up to the very brink of the turntable pit.

Then, although the main body of the train naturally holds the siding signal red, a "call-on" or yellow flasher signal beneath the red signal goes into action, and the brakeman gives the other helper engineer the "come ahead." Thus the train is completely coupled

up, both helpers have been cut out, and only their turning-around remains.

On your first few times through these sheds and onto that covered turntable, you'll say, "Brother, can you spare a compass?" But the fireboy turns the engine, and he knows where to stop her because the interlocking man has lit a yellow light at the exit track he wants you to take coming out. And, Mr. Engineer, don't forget a 4-8-8-2 *just* fits on the table, so spot her carefully.

You finally move out your prescribed alley, grab a hooped-up clearance card (and orders, if you're close on the time of westbound passenger trains), and begin the 85-mile descent to Roseville.

DOWN THE MOUNTAIN

Running light down the hill, you use only the independent, or engine brake. You turn on the wheel-coolers too, to keep the driving-wheel tires from getting too hot from the friction of the brake shoes. And, if it's summer, you'll make sure the sprinkler system is working. This sprays the ties with water as a fire precaution.

As you head west from Norden, you look back across the eastbound main line beside you and see a most unusual train-order signal. It governs eastbound traffic and is located not at the train-order office as is usual practice, but at the beginning of the sheds, about ⅛-mile in advance of any orders to be received. The reason is obvious once you see the inside of those winding caverns; there simply would not be time for an engineer and his fireman to see the customary order board in there, first in stop position, then cleared for the train to pass without orders. Or, suppose the operator has orders for the train. The rule on the Southern Pacific is to "wink" the board — move it from red to green and back to red twice, but after the operator is sure the engine crew has first seen it in the stop position.

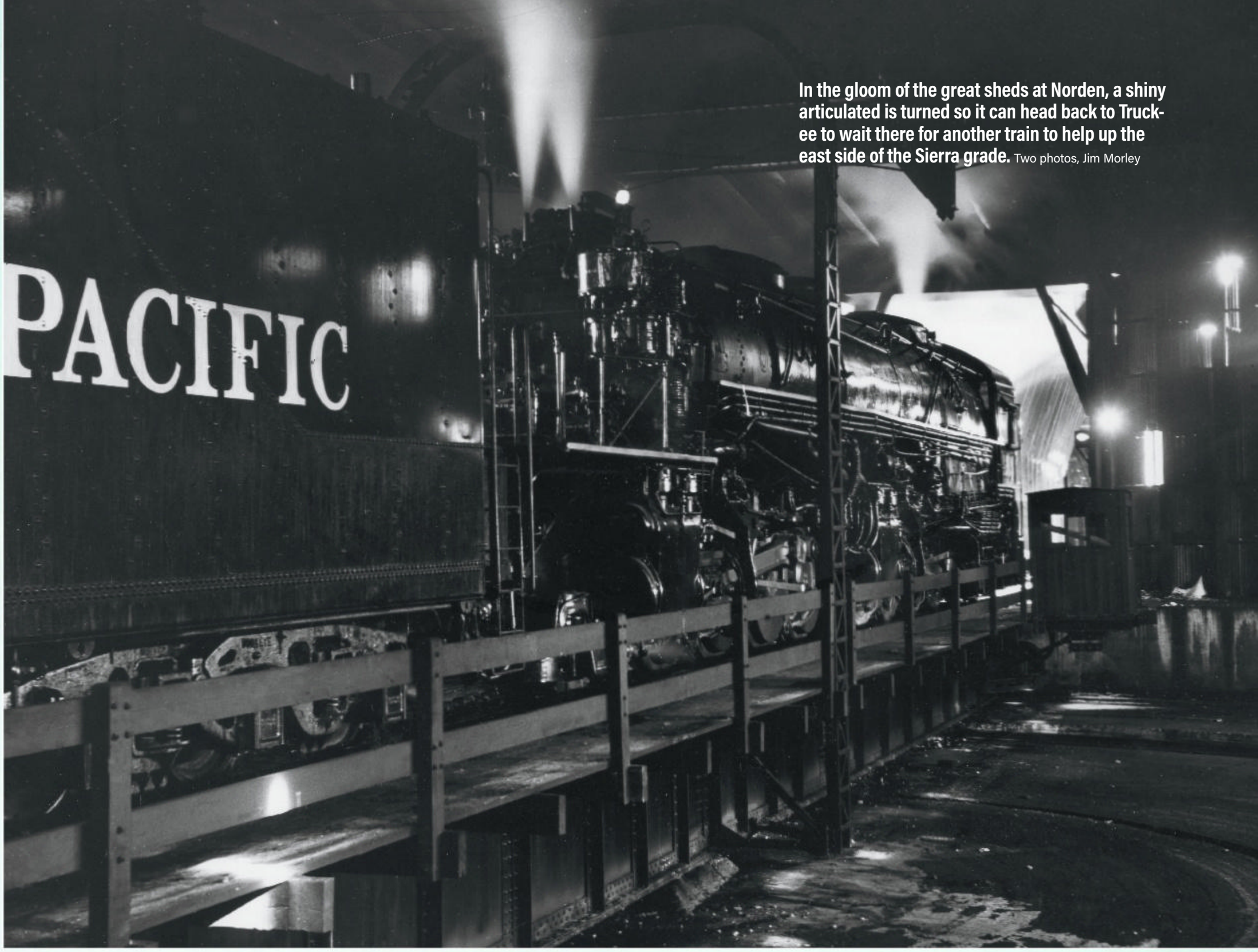
To solve the problem at Norden, and at some other tricky points, a signal resembling an automatic block signal is used. It has two color-light positions, and beneath it are the words train order signal, which light up when the signal is in use. As a train approaches, the red light goes on; if no clearance or orders are to be given to the train, the operator douses the red light and turns on the green. If he has orders, he leaves the signal at red. A similar signal is used on the westbound main.

On this helper trip you will encounter such a signal at Emigrant Gap going down. That's another reason you're the "key man": You must know not only how to handle your engine and train, but also what the various types of signals mean, and where to look for them. And remember, the double-track roller-coaster line you're going down is protected by automatic train control. Suppose you begin to catch up with a train ahead of you? In that case, before long you'll come upon a yellow signal; you may find the next one red, and have to stop. What then?

The rule governing red signals on double track is, briefly, "Stop, then proceed with caution, not exceeding 12 mph." So here you will call upon the services of still another gadget in your cab: the "forestaller." If you crank this contrivance around to the proper point, it permits the engine to pass over the track magnet which would otherwise apply the brakes. So you pass the yellow signal at reduced speed, and then pass the red one after

AC-7 cab forward 4164 boosts a freight over the 2.5% grade at Cape Horn. David G. Edwards

The interior of the snowsheds have changed little since early days. However, the quantity of sheds has been greatly reduced from 38 miles in 1880.



In the gloom of the great sheds at Norden, a shiny articulated is turned so it can head back to Truckee to wait there for another train to help up the east side of the Sierra grade. Two photos, Jim Morley

stopping at it; and you proceed with caution as required — but it takes the "forestaller" to get you past the red.

You're tired when you get back to Roseville. It's been a routine trip, but you've been a pretty busy man, and you've covered 170 miles.

A RUN UP THE VALLEY

Next day you're ordered to run "up the Valley" to Gerber. This is another kind of railroading: it's single track, and you find a fistful of flimsies clipped to your order board. And the engine they've given you! Some piece of machinery! She's often referred to jokingly as a "Valley Malley," for she's a 2-8-0, the equivalent of half a 4-8-8-2. Her reputation is bad, her number is 2805. Your train is 99 empties, which is good, because she won't go very far very fast with that load, and the 2805 is a rough-rider. Some of her sister Consolidations purr along quite cushiony, but not this one.

You're running as First 498, so 2805 is "wearing the green." She has green flags fluttering up by her stack and the classification lights are burning green, a notification to westbound trains that at least one more section of your train is coming behind you. The timetable lists you as "Eastward, Third Class," and one of your orders gives you 20 minutes on No. 201, which is another way of saying that the Gerber-Roseville-Sacramento passenger local is running that many minutes late on its schedule, so perhaps with luck you can make it to Marysville, 34 miles ahead, for a meet with it.

As you leave Roseville, you cross the double-track Overland Route and curve past the little depot. Keeping those 99 cars rolling up the grade is a chore. The herder highballs you with his green flag and you take off, having quite a time getting them out onto the lead. The little old girl has been sitting for some time, and her firebox is cold. The fireman has to pour more than the desired amount of black smoke up the stack at first, and you have your reverse lever down in the corner and the throttle wide open. She's working hard, and making barely 5 mph!

Yes, it's quite a chore. And if she slips and goes into one of those furious spins, you open those sander valves in a hurry, and maybe ease off on the throttle — but not unless you have to.

Now you've finally gained some momentum, and as you pound out of town you check those orders again, just to be sure.

The timetable formerly listed three scheduled westbound freight trains, which were superior to yours by direction. But the new timecard eliminated them. All westward freights are now run as extras, so you don't have to worry about that. However, one order mentions Extra 2341 West. You're to meet him at Whitney, 11 miles out. You'll hold the main track, so he'll probably be waiting "in the hole" and you can breeze on by.

You whiz past the extra in good shape, whistling signals to him to call attention to your green flags and lights and your indicator box, which gives your train number, 1-498. Those little 57-inch drivers under you are churning at what seems a hundred miles an hour, but you're making no more than 25 or 30 with a wide-open throttle. By now, of

course, you've raised that reverse lever as high as you can while still imparting the necessary power to the drivers.

The schedule calls for you to meet the "Dinky" (that's 201) at Marysville at 5:16 p.m. Freights rarely stay on schedule, but you're not far behind yours today, and with that 20-minute run-late on the passenger train you should make that meet. Of course this will put you down the passing track, and Marysville is a bad place to get a long, heavy train through. Levees surround the city, and the track climbs over them at both ends of town.

You must figure your water, too. It will be better to "run Marysville" (go past it) and continue another 4 miles to Berg. You can take water there, and then you'll make Chico for the next tankful. If you were to leave your train on the bridge at Marysville, then cut off to take water and return to the train (you'd have to do this in order to make a run through that sag between levees), you would likely "lay out" (delay) 201 some more — and you wouldn't have enough water to make Chico, either.

All this time you are a busy man. Your tin gods are the timetable, your orders, and your railroad watch. You check the time, to be sure you can get to Marysville in time for that meet. If you can't, you'll have to take siding at Wheatland, the last point this side of Marysville with a siding long enough for 99 cars. Your trusty timepiece says you can go, and you do. You have a good wheel on them now, and you know the road. Knowing the road is perhaps the most important single factor in doing a good job of railroading, whether you're engineer or fireman. You must know where the grades are, and how a train acts through this sag or over that hump.

You're in luck as you cross the bridge and come over the levee. No. 201 is waiting on the main, so your head brakeman trots ahead and lines the switch, and you ease down through town on the siding, ready to "go after them" as the grade again rises under you. As you pass the first-class train at the depot you hear its head brakeman shout, "Highball the gate!" He means you don't have to slow down for your rear brakeman to line the switch back to the main line, and so lose your momentum for that hill; the passenger man will throw the switch.

First thing you know you're blowing the whistle for the main line as you go into the interlocking at Binney Junction Tower at the top of the levee just ahead. You also cross the Western Pacific here, and the whistle signal is one long blast and three shorts. Soon the interlocking gives you the green and you go on to Berg for water.

Now, about the rest of those orders you got at Roseville. You've got a couple of slow orders, identified by milepost and structure locations. And you have one reading:

C&E [Conductor and Engineer] First 498, Second 498, Extra 2790 West, and Extra 4340 West

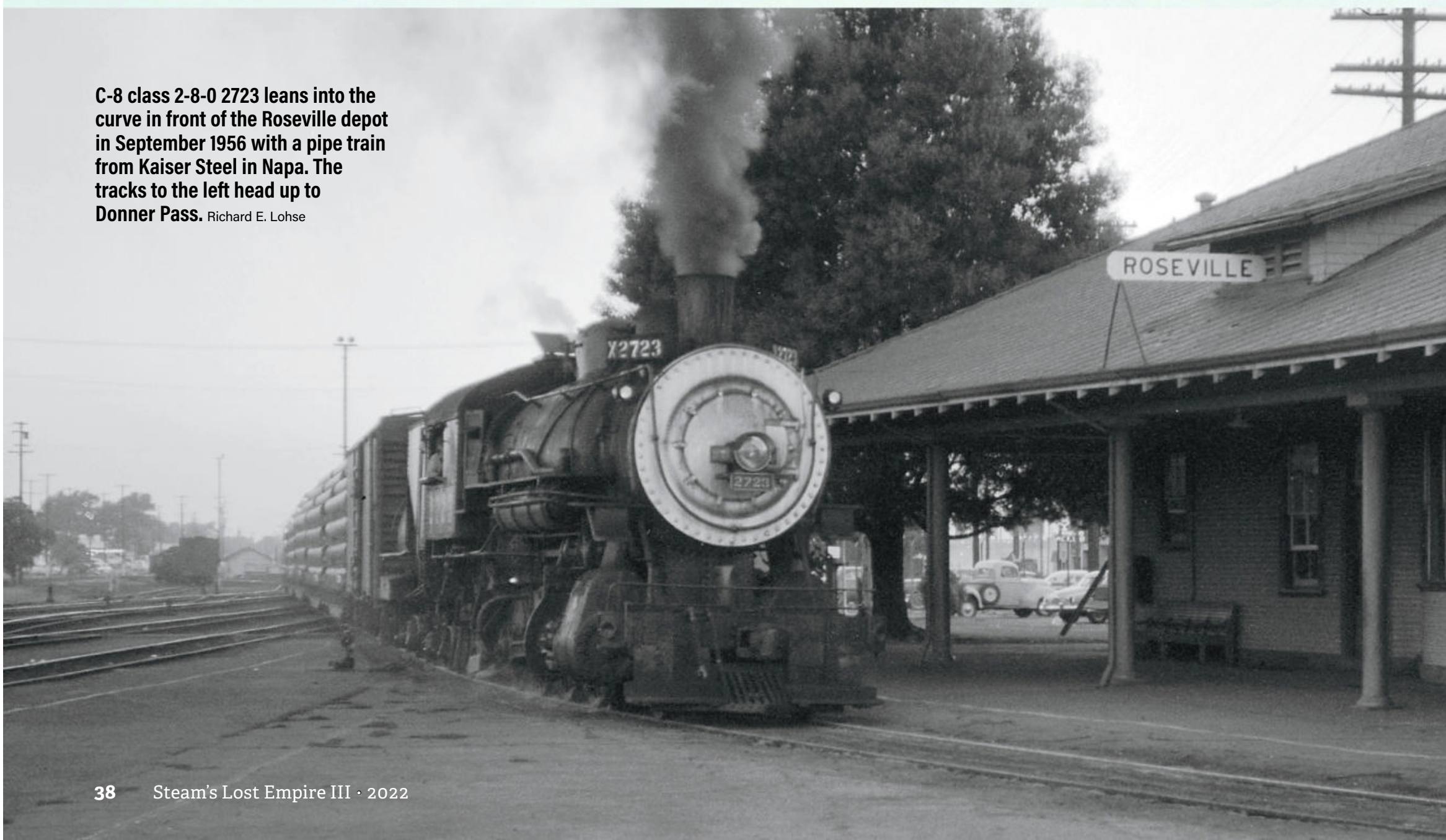
Extra 2790 West has right over First 498 Tehama to Gridley and right over Second 498 Tehama to Marysville.

Extra 4340 West take siding and meet First 498 at Chico.

Second 498 run two hours late Roseville to Tehama.

Perhaps this order, addressed to the four trains it references, seems like a complicated handful, but let's see how much of it concerns your train, First 498. You are most concerned with the first line, and half of the second ("Extra 2790 West has right over First 498 Tehama to Gridley"), because you are First 498. The last line of the order tells you that Second 498 is behind you, running two hours late; and of course it is going the same direction you are, so you can forget about him.

Next you are interested in Extra 4340 West, which will be in the siding for you at Chico. The "has right over" portions of the order mean that the opposing train's right to the main line ends at the siding switch approaching the point named, so it must head in and clear the main line; hence you will also find Extra 2790 in the hole at Gridley. If 2790 is not there, you can proceed up the main line to the entering switch at the other end of the siding, but there you must wait until 2790 arrives. Usually the dispatcher plans such meets between trains knowing the first train will have time to be in the clear for the second.



C-8 class 2-8-0 2723 leans into the curve in front of the Roseville depot in September 1956 with a pipe train from Kaiser Steel in Napa. The tracks to the left head up to Donner Pass. Richard E. Lohse

'LIBERTY BELL' AT LIVE OAK

After leaving Berg with your full tank of water, you hightail it over to Live Oak, where an automatic interlocking plant will get you across the Sacramento Northern electric line. As you whistle for the road crossings and blast through town you notice an old teakettle, No. 1776, standing on the siding with about a dozen cars and a caboose. This is a local freight, powered by an engine known as the "Liberty Bell" because of her patriotic number. She's an old 2-6-0 Mogul, and you'd be surprised what she'll pull when she has to.

At Gridley you find Extra 2790 West in the siding, but as you approach the station the train-order board winks. You are to pick up more orders on the fly. Road crossings are numerous here, and you bear down on the whistle long and hard. You needn't fear breaking the 40-mph speed limit, not with 99 cars. Another thing: freight is allowed 50 over certain stretches of this line — unless it is hauled by an engine restricted to lesser speeds. You must consult the timecard to see if your power comes under such restrictions. Also, some bridges restrict the speed of heavy engines. These are just additional points to check when sitting in the engineer's seat.

Now you're passing the order-hoop holder and you point your gauntleted hand and arm, aimed to snatch the orders. You slip them free from the hoop and throw the hoop to the ground so the operator there can use it again. You open the tissues and read:

C&E First 498.

Orders for you are 17, 106.

This is your clearance card, which also includes the name of the office which issued it, the date, the time okayed, the chief train dispatcher's initials, and the receiving operator's name. All orders must be accompanied by a clearance card listing the numbers of the orders — all, that is, except those delivered to one train by another train at a meeting or passing point where no train-order office is available. In such cases the orders are addressed to your train "in care of" train so-and-so.

You continue to the first order, No. 17:

Extra 4340 West hold main track and meet First 498 at Richvale instead of Chico.

You mutter under your breath as you note the change in meeting points and more particularly the fact that you, not the opposing train, now must head in and stop. It's a hard uphill grind most of the way along here, and you're thinking about your water — it may be running low. You read order 106 next:

Extras 4236 and 3277 West hold main track and meet First 498 at Chico, Second 498 at Richvale.

"Well, that does it!" you tell yourself as you hand the orders to your fireman and make a beeline back over the top of the tender tank to measure the water. You're now less than 3 miles from Biggs, your last chance to take water before Chico — and the grade gets worse into Chico. You'll practically have to stop for heading-in twice before you reach that water spout in Chico, and that means you'll use extra water. The safe bet is to stop at Biggs, so you do.

From the two flimsies you just received it's evident the dispatcher wants to get those extras over the road; they're piling up on him. He's giving them all the main line, forcing both sections of the regular eastbound freight, 498, into sidings. You can surmise, too, that Extra 4340 received an additional order heading-in your second section for him, probably at Gridley. But this is no concern of yours. Just take that water, struggle to Richvale with your logy train, head in, and wait. You can lose a lot of time waiting at meeting points on a single-track railroad, but it does no good to fret about it.

Mountain type 4340 wheels its train past Richvale at a smart gait, and you are off again. Your little 2805, jumping all over the place, gets 'em up the hill and into the clear once again at Chico. By now you are getting weary and the night is not so young. While coming up the hill you noticed that the lubricator, right above your head and a bit to the left, is about dry. Well, you'll have plenty of time to refill it in the passing track here waiting to meet Extras 4236 and 3277.

And here I'll leave you and First 498. You're only 30 miles from Gerber now, and you'll make it sometime tonight — or tomorrow morning.

KEY MAN OF THE CREW

It's not hard to see why the engineer is the central figure, is it? He has a lot on his mind. Plenty of train orders, and it's their interpretation that counts. There are train register checks, too, which the conductor must give to the engineer at certain points and which list superior trains which may have arrived and left.

There are rules from the Book of Rules — like No. 93, the yard limit rule, and No. 509, the automatic block signal rule, and No. 99, flagging for protection of the train. Although he may not always have to actually perform the tasks demanded by a rule, the engineer must know the meaning of it and know that it is executed.

And whistle signals, the audible language of railroading, must be second nature to the engineer. He must know the special ones, like that "one short and three long" whistle he had to give back at Marysville — or at least where to find them in the timetable. Or perhaps he finds an illuminated letter "M" on signal mast No. 1706 at Emigrant Gap, back there on the mountain. That means "Proceed to train-order office." An "S" means he must enter the siding there. And there are special instructions in the timetable, bulletins that may change or amend some of those instructions, and there are special notices.

The gadgets surrounding the man on the right-hand side of the cab vary in quantity and quality. Some engines are big and some are little — some so little and so old that they still employ a heavy old Johnson bar for a reverse lever. Some have the old-time Stephenson valve gear, which has eccentrics on an axle underneath the boiler, between the drivers, so the engineer must stand on a side or main rod to oil them. A thousand and one mechanical things must be remembered, such as opening drain cocks before starting a dead air pump, draining condensation from main reservoir air tanks, and always opening cylinder cocks after an engine has stood and has condensed steam into water in the cylinders. Water can blow out a cylinder head in starting.

And the engineer needs experience with the out-of-the-ordinary, such as how to operate the fire-fighting water pump astride the slim boiler of Norden's famous antique fire-train engine. Or how to pack a sizzling hotbox on the trailing truck of the engine in a dense fog.

And, of course, the engineer is always responsible for the fireman. I am a fireman, and I can sympathize with the man across the cab. What a life he leads! But there are compensations, for what could be more stimulating than a front-seat view of the High Sierras from a cab-in-front articulated, or a swift trip down to Oakland on the *San Francisco Overland*? Yes, as an engineer you certainly get variety and you certainly get around. But don't ever forget: sitting at the throttle of a locomotive means it's all "in your lap," because you are it. You're the key man of the crew!

LOUISVILLE & NASHVILLE Ten miles south of Louisville, two L&N trains pass each other at speed at about 1:45 p.m. one day in November 1948. Coming at us in a hurry is Cincinnati-Birmingham train 7 behind 4-8-2 No. 407, one of 22 class L-1 engines (Baldwin, 1926 and '30) that constituted the railroad's largest passenger power. At right, 2-8-0 No. 1212 (one of 54 class H-25 Consolidations built by Rogers, Baldwin, and L&N itself during 1907–10) makes time with a local freight headed north. C. William Streit

NICKEL PLATE ROAD/BALTIMORE & OHIO Lodi, Ohio, where Baltimore & Ohio's main line to Chicago crossed over Nickel Plate's Wheeling & Lake Erie District, hosts steam trains of both railroads in this March 1957 scene. Up above, B&O Q-4 Mikado 472 leads a freight west toward the big yard at Willard. On the lower level, below the tell-tales for the B&O bridge, is NKP S-1 Berkshire 728, waiting in the siding for a meet. In 2022, both lines are in service and the old Wheeling depot still stands. Herbert H. Harwood

West Trenton: New Jersey HOT SPOT

Photo essay by **W. R. Osborne**

OVERSHADOWED BY THE PENNSYLVANIA'S ELECTRIFIED CORRIDOR A FEW MILES TO THE SOUTH, THE READING'S NEW YORK MAIN LINE BUSTLED WITH STEAM-POWERED VARIETY

Although B&O trains began operating over the New York Branch in 1890 upon the launch of the Royal Blue Line, the B&O didn't employ its own power until its "President" Pacifics arrived in 1927. P-7 No. 5311 *President Fillmore* rolls the *National Limited* westward at Pennington, 5.4 miles east of West Trenton station.

FROM
AUGUST
1968
TRAINS
MAGAZINE

West Trenton, N.J., on the Reading Company's multiple-tracked New York Branch, was a great place to watch trains in the late 1930s and '40s. The station, at the end of Reading's Philadelphia suburban territory, saw more than 130 train movements each 24 hours, although the open country to the east offered the best photo possibilities. The line was part of Baltimore & Ohio's Royal Blue Line, which provided Washington–New York service in partnership with Reading and Jersey Central. An eight-hour visit to the station in 1938 would reward one with 10 B&O express trains, 13 Reading expresses, dozens of M.U. suburban trains west, and several gas-electrics east. The expresses and freights were steam-powered, with perhaps one hauled by B&O's new EA/EB diesels on certain days.

In 1938 this unique cast-iron milepost was located a short distance east of CN Tower in West Trenton. The cinders of more than 60 steam-powered trains dusted it each day.

War is over that tree-lined horizon 9 miles east of West Trenton, and the evidence is an eastbound troop train negotiating Crusher Curve behind the tank of Reading center-cab I-8sb Consolidation 1604. The 1,400-mile road rostered more than 800 2-8-0s, built between 1880 and 1925; at 117 locomotives, the versatile I-8 was the most numerous of any Reading class.

Six miles east of West Trenton, the engineer of Reading G-1sa 106 gives his steed a careful look as he wheels an eastbound express past GH Tower at 70 mph, 10 mph shy of the New York Branch's maximum. While Pennsylvania men called their Philadelphia-New York expresses "Clockers," Reading men referred to theirs as "Yorkers."

Some of West Trenton's trains were prosaic — electric M.U.'s from Philadelphia and gas-electrics from Bound Brook and Trenton. Some were exotic — including Reading's Budd-built *Crusader*, which made two Philadelphia-Jersey City round trips per day. Streamlined Pacific 118 (class G-1sas) accelerates the afternoon eastbound *Crusader* through Ewing.

The semaphore blade has already begun to fall as Reading G-2sa Pacific 178 sweeps under the signal bridge near Glen Moore with a New York-Philadelphia express. In common with Delaware & Hudson, Reading became interested in clean-lined English engines and, as a result, semi-streamlined two Pacifics. Say, is that a horn tucked under the running board?

18+

WHAT IS AVAXHOME?

AVAXHOME-

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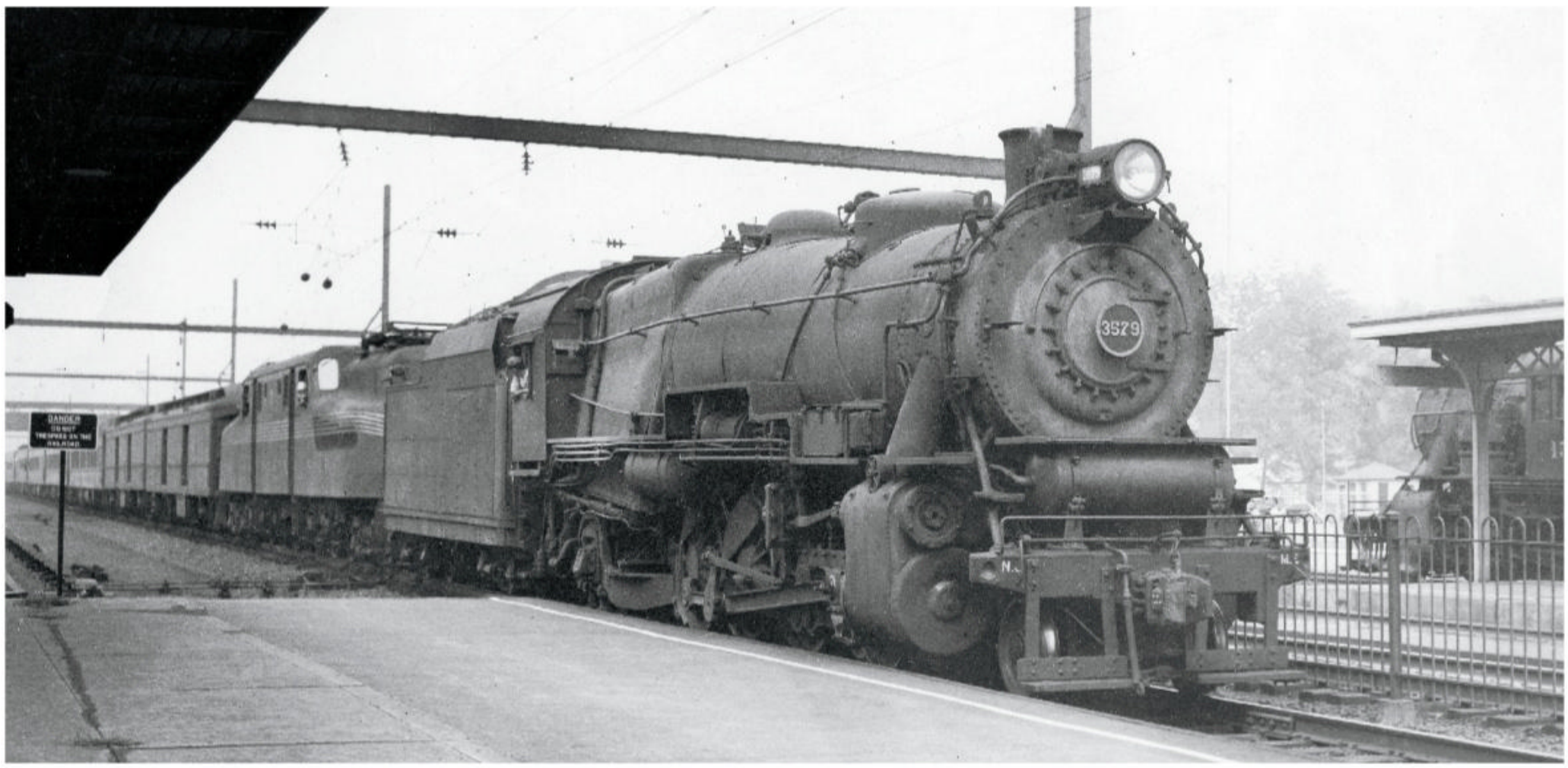
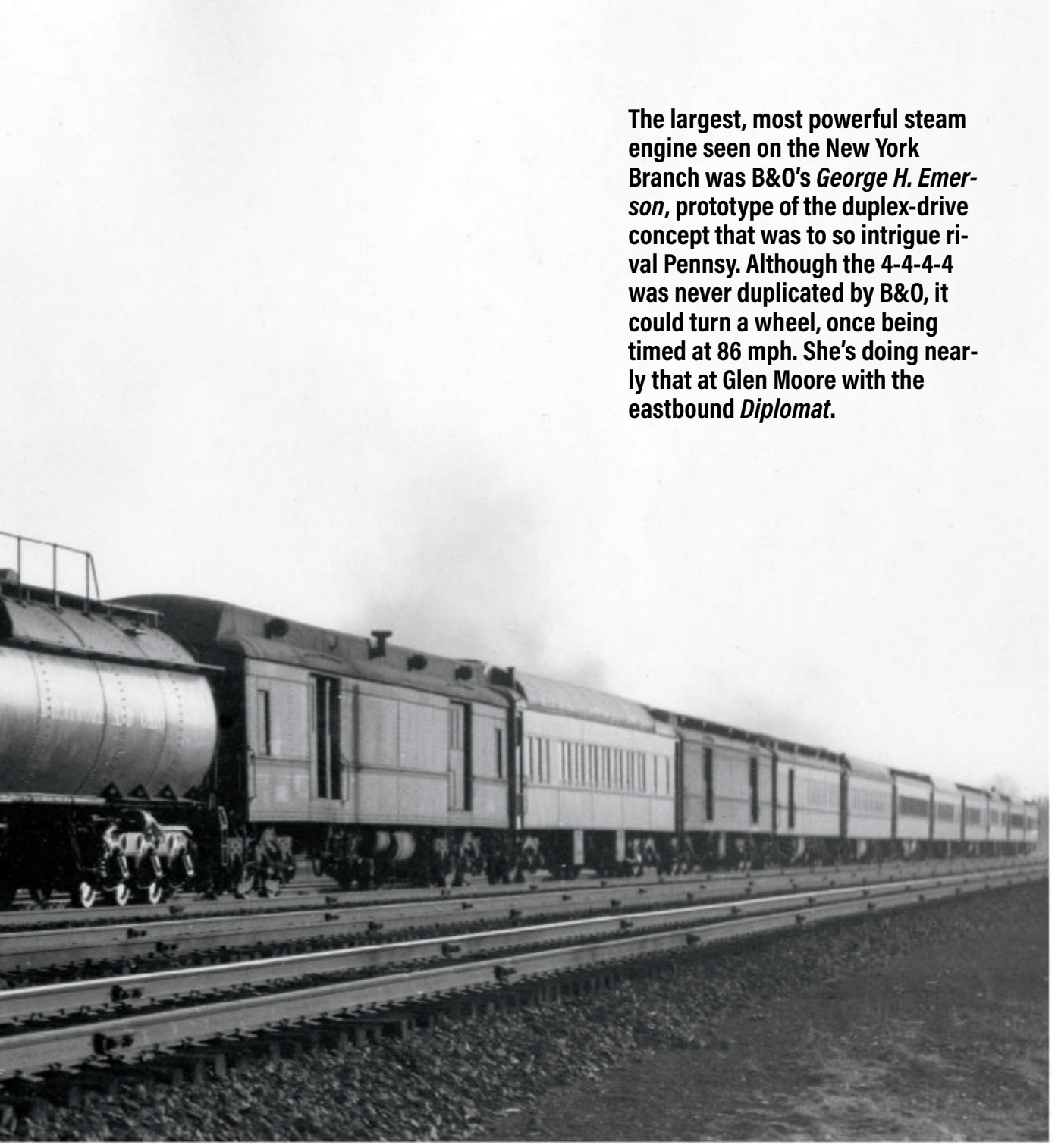
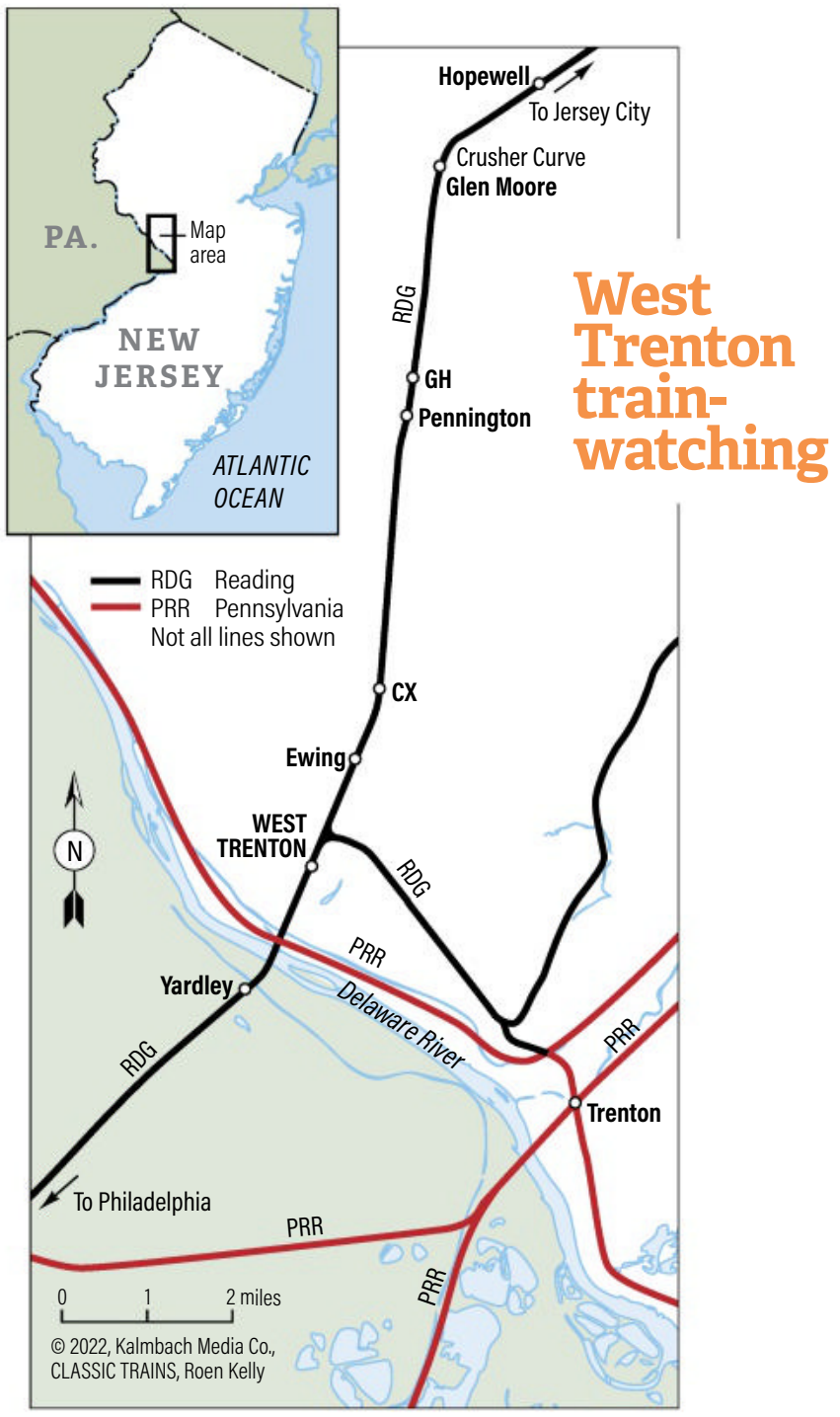


Oh, oh — a wreck on Pennsy's main line has required detouring over the rival Reading. The train's GG1 electric is piloted west through West Trenton station by PRR L1s Mikado No. 3579. Engineers of the steam and electric power appear to be engaged in a conversation, but it is doubtful that the talk could be audible over the rod clank of the 2-8-2.

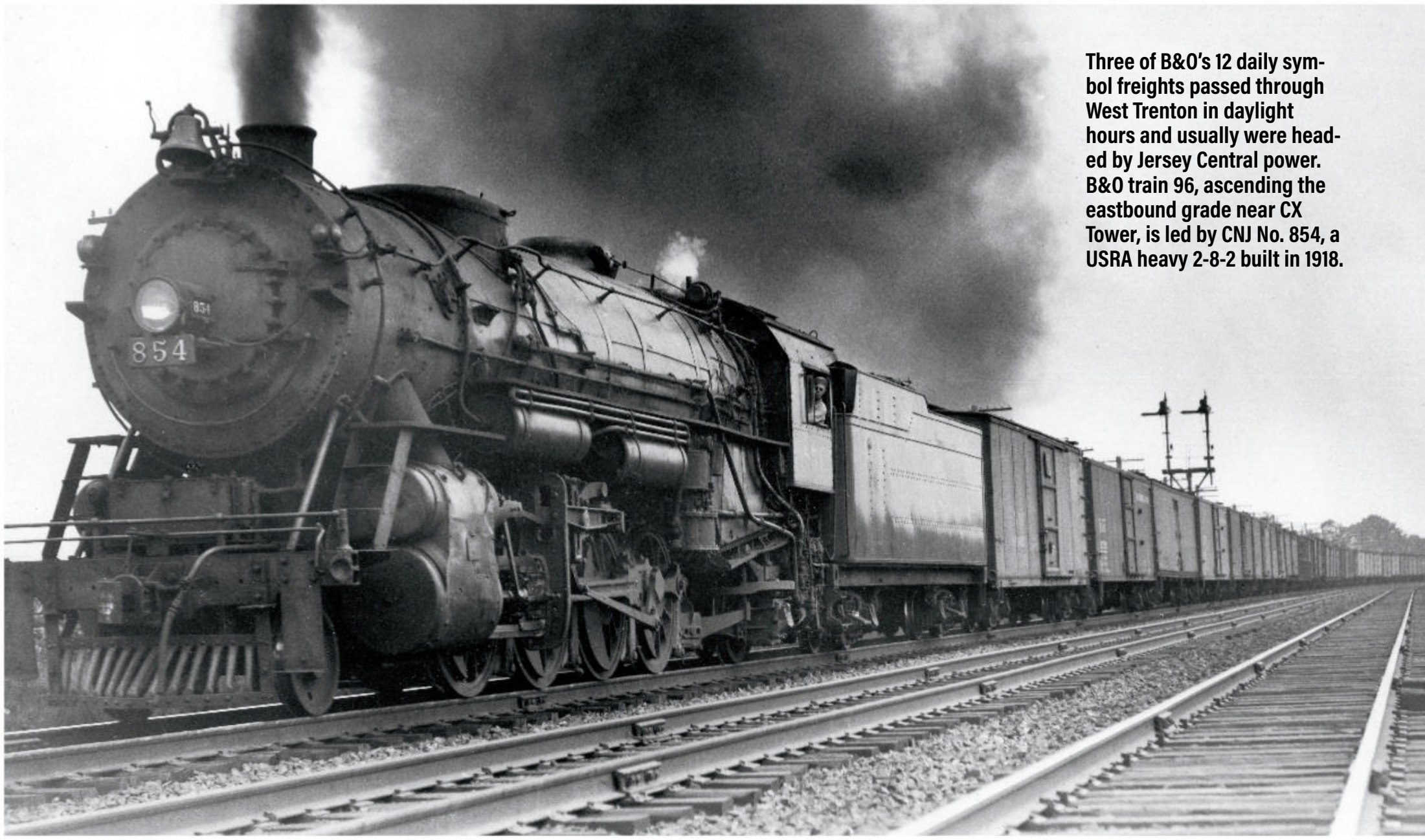


The largest, most powerful steam engine seen on the New York Branch was B&O's *George H. Emerson*, prototype of the duplex-drive concept that was to so intrigue rival Pennsy. Although the 4-4-4-4 was never duplicated by B&O, it could turn a wheel, once being timed at 86 mph. She's doing nearly that at Glen Moore with the eastbound *Diplomat*.

West Trenton train-watching



Snow swirls as B&O Pacific 5303 *President Madison* ascends the 0.7% grade through Ewing with the eastbound *Columbian*. The 20 P-7 engines of 1927, the ultimate in B&O Pacifics, shared many design features with Pennsy's K4.



Three of B&O's 12 daily symbol freights passed through West Trenton in daylight hours and usually were headed by Jersey Central power. B&O train 96, ascending the eastbound grade near CX Tower, is led by CNJ No. 854, a USRA heavy 2-8-2 built in 1918.

The reason for multiple tracks is evident as an eastbound Reading local freight led by I-8sb Camelback 2-8-0 1535 is overtaken by President Pacific No. 5311 with a B&O express. Several classes of Reading Consolidations could be observed on the New York Branch; their duties included helper service over the 14 miles between Neshaminy Falls, Pa., and CX Tower.

For all its popularity, the 2-8-2 did not impress everybody. Some roads (Bangor & Aroostook, Kansas City Southern) ignored it; others purchased the wheel arrangement in small numbers. Reading had only 57 Mikados, built during 1912–17. M-1sa class 1726 has a westward extra rolling east of Crusher Curve. Reading's T-1 4-8-4s were several years in the future.

America's largest anthracite carrier dispatched many coal trains over the New York Branch to Port Reading, N.J. Engines like I-9sb Consolidation 1903 (Baldwin, 1922), heading 80 empty hoppers west on the three-track section at Ewing, handled the bulk of this traffic.

SANTA FE Five locomotives, plus the tender from a sixth, stand outside the Santa Fe roundhouse at Wellington, Kan., in June 1953. At center, 2-10-2 No. 1690 faces 4-8-4 No. 2914. Engine 1690 of the 32-member 1674 class (Baldwin, 1912–13) sports the tender from one of Santa Fe's 10 huge — and massively unsuccessful — 2-10-10-2s of 1911, which were rebuilt within a few years into 20 2-10-2s of the 3010 and 3020 classes. The 2914 was one of 30 outstanding 2900-class dual-service 4-8-4s built by Baldwin in 1943–44. Stan Kistler

NORFOLK & WESTERN One of the 43 class A fast freight 2-6-6-4s, built at N&W's Roanoke, Va., shops between 1936 and 1950, marches up Blue Ridge Grade east of Roanoke with a merchandise train sometime in the mid-1950s. Although it did not originate the wheel arrangement (Pittsburgh & West Virginia did in 1934), N&W owned nearly three-quarters of the 60 2-6-6-4s built. The only other 2-6-6-4 owner was Seaboard, which had 10. N&W A 1218, now at the Virginia Museum of Transportation in Roanoke, hauled Norfolk Southern excursions for five years (1987-91). Jim McClellan

A paean to the Pacific

THE 4-6-2 WAS THE RIGHT ENGINE IN THE RIGHT PLACE AT THE RIGHT TIME

By **David P. Morgan**

FROM
SEPTEMBER
1988
TRAINS
MAGAZINE

Someday someone should write a book, a big book, about the Pacific type steam locomotive. How pervasive was the Pacific, you may ask? Let us enumerate the ways. Pacifics were employed on properties deemed off-limits for Electro-Motive's E units. Pacifics steamed through 49 of the 50 states, from Fairbanks, Alaska, to Key West, Fla. Pacifics were stabled by railroads which ignored the more numerous freight contemporary, the Mikado. More than three times as many Pacifics rode U.S. rails as did all of the passenger A1A-A1A cab units produced by the diesel builders.

A simple quiz will demonstrate Pacific popularity. Ask an enthusiast of significant steam seniority to prepare two lists. On list 1, he should jot down the Class I roads on which he traveled aboard scheduled steam trains; on list 2, the lines he rode behind 4-6-2s. Answers will be similar or, chances are, identical.

Passengers and pace constituted the rationale for the Pacific, and a couple of quotes help us to understand. In the very first issue of TRAINS, Lucius Beebe dwelled on the inherent drama of the wheel arrangement: "To catch the *Kaysee Flyer* on the Mopac as her big Pacific leans to the curve coming out of Webster Groves and stop the side motion with a shutter speed of 1/660 is to experience what the big game hunter knows as a bull elephant looms in the sight line of his Ross rifle."

In his book *Passenger Terminals and Trains* (McGraw-Hill, 1916; republished by Kalmbach in 1969), John A. Droege exclaimed, "Faster schedules do not earn more money — they burn it — but the public wants fast trains." Not to mention the Post Office Department.

The Pacific type would, of course, have been aca-

Katy 412 exhibits the balanced proportions inherent in the 4-6-2 type. MKT passenger-power development peaked with the Pacific; Nos. 409-413 (built by Lima in 1923) were among the road's last steam locomotives. CLASSIC TRAINS collection

Pennsylvania K4 5413 heads west at Dodson, Ohio, in the 1950s. PRR embraced the 4-6-2 after other roads had turned to larger locomotives. Tom Scholey, David P. Oroszi collection

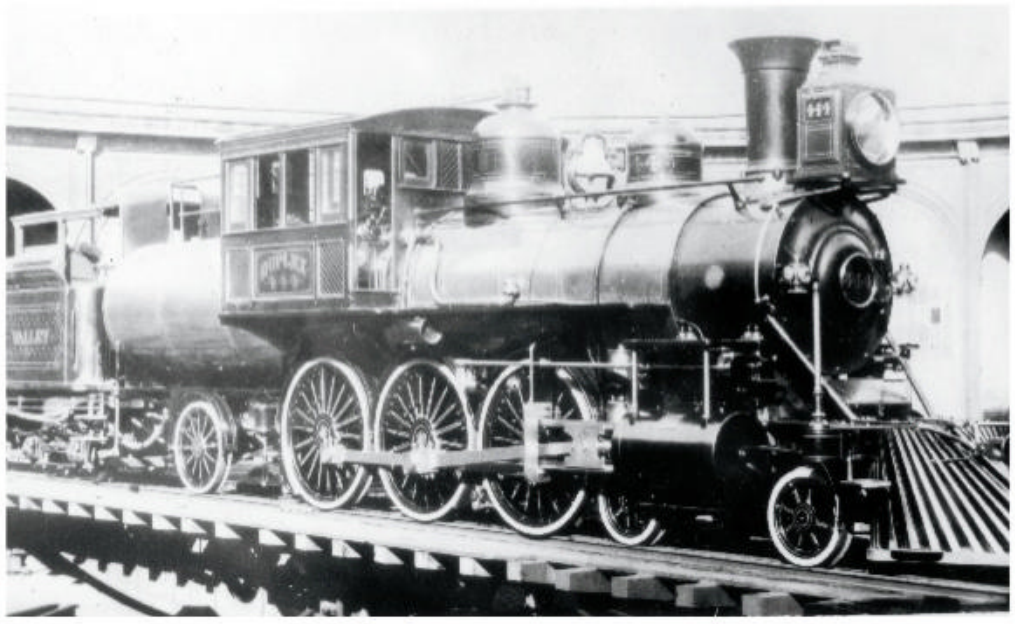
demic if railroading — to the joy of master mechanics, road foremen, and dispatchers — had adopted a single-speed, single-locomotive strategy whereby 2-8-2s pulled passengers and tonnage at a common 45 mph. But Pacifics were by definition swift and elite, as in the explanation by the *Locomotive Cyclopedia*: "Used for heavy fast passenger service." Their four-wheel engine trucks implied stability at speed; and their six large-diameter driving wheels denoted horsepower rather than tractive force.

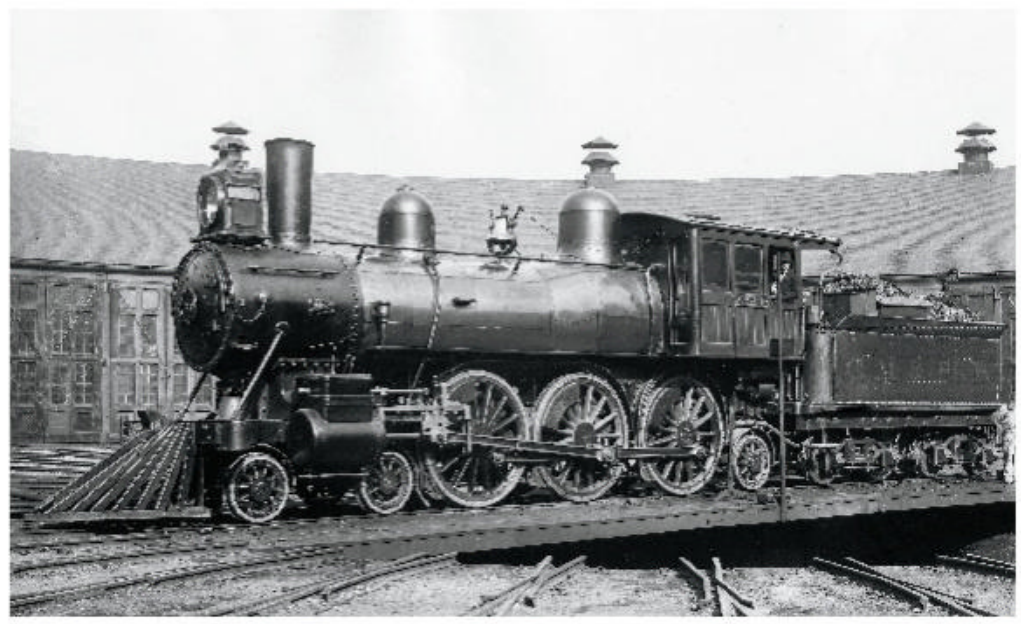
THE PEAK PASSENGER ENGINE

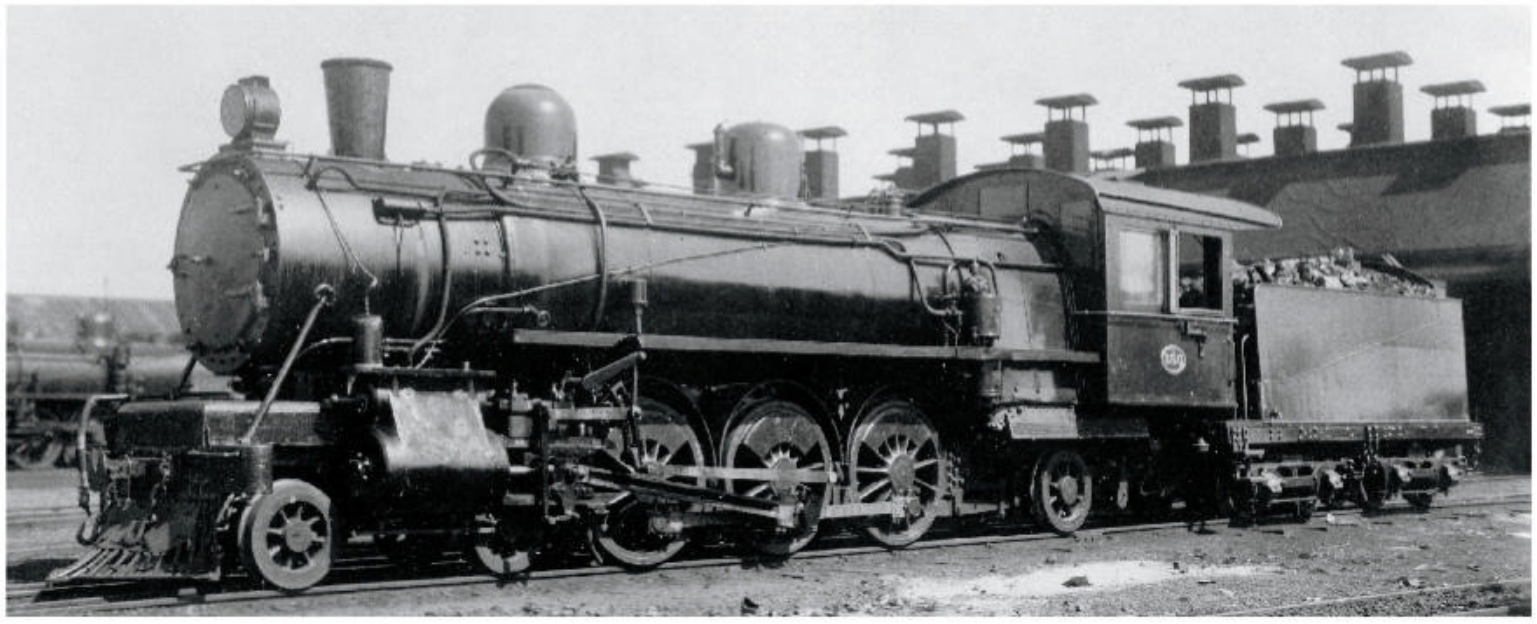
History will record the Pacific as the majority passenger locomotive of the 20th century because its inception and development coincided with the peak season of rail passenger traffic. Annual passenger counts of the directly operated lines of the Pennsylvania Railroad were 41.9 million in 1900, 55.7 million in 1905, 69.9 million in 1910, and 73.5 million in 1915. Compound this unimaginable traffic growth with the introduction of the steel coach and Pullman sleeping car in 1906 and '07, respectively, and the road's simultaneous leap from the D16 4-4-0 to the K4 4-6-2 becomes explicable.

Nationally, Class I railroad ridership peaked at 1,234,862,048 passengers in 1920, a year after the heavy USRA 4-6-2 established the ultimate pattern for the wheel arrangement. But just as longer, heavier, faster, more frequent, and steam-heated trains had made the Pacific the century's inevitable and

Alco demonstrator 50000 by Francis J. Cole, noted as "the first maximum 4-6-2," pulled the Pacific type into the 20th century. Classic Trains collection







Above left: Lehigh Valley camelback Pacific No. 444, dubbed the *Duplex*, is the first known locomotive with a 4-6-2 wheel arrangement, built in 1886. Above right: Milwaukee Road F1 796, sporting a wooden cab, poses with crew on a turntable. Left: New Zealand Railways Q class Pacific No. 350 was possibly the first with a fire-box to justify the trailing truck. Three photos, CLASSIC TRAINS collection

most popular passenger locomotive, the public disaffection with train travel from the 1920s onward made it impossible for another wheel arrangement of any propulsion to challenge its record.

In his *The Steam Locomotive in America* (W. W. Norton, 1952), Alfred W. Bruce estimates total U.S. Pacific production at 6,800 engines — 6,000 domestic and 800 export. Do keep that export figure in mind, for it includes what Baldwin recorded as the legitimate claimant to the title of the first 4-6-2.

Illustrations abound of the impact of those 6,000 4-6-2s on the American passenger train. Consider the name trains introduced by Pacifics: *Alton Limited, Capitol Limited, Crescent Limited, Crusader, 400, George Washington, Mercury, Olympian, Panama Limited, Pan-American, Sunshine Special, Texas Special* . . . it would require the marriage of streamlining and EMD's E units to exceed that guest list. A slew of railroads — one thinks of Alton; Chicago & Eastern Illinois; Monon; Erie; Kansas City Southern; Katy; and Reading — never demoted their Pacifics until dieselization. Indeed, only three carriers of any passenger significance — New York, Ontario & Western; St. Louis-Southwestern; and Western Pacific — failed to inventory the wheel arrangement; all three leapfrogged from 4-6-0s to 4-8-2s. As for appearance (and passenger locomotives are, or should be, by definition, stylish), those 6,000 Pacifics embraced what has been adjudged, albeit not unanimously, the handsomest (Southern's Ps-4) and ugliest (Norfolk & Western's E) steam specimens.

The Pacific was the right engine in the right place at the right time. Only in America existed the physical plant and the passenger traffic to exploit the 4-6-2 as the 20th century dawned. And the ink on the original side elevations was barely dry as technology began to complement size. Superheaters, Walschaerts and Baker gear, mechanical lubricators, power reverses, mechanical stokers, feedwater heaters — suddenly they enabled the Pacific to be better as well as bigger than its predecessors. Seldom has a greater disparity between prototype and replacement come about so quickly in a wheel arrangement.

Conversely, the Pacific was not Super Power. As a consequence, the Pacific was of a size and a seniority to age gracefully, to fully amortize its investment. Pacifics slipped from limiteds to locals with aplomb — and were around to doublehead their Hudson and Mountain and Northern replacements without losing stride when the going got tough. What computer could comprehend the number of commuters that Pacifics hurried home to Hohokus and Woburn, Downers Grove and Matawan, Winnetka and Redwood City? In their old age, some Pacifics even donned sheet metal and bright paint to stand in for internal combustion on streamliner segments deemed too short to warrant diesel equipment trusts.

When you consider that for all practical purposes orders for new Pacifics ceased after 1930 and were scarcely common even then, the wheel arrangement celebrated its longevity with, as Beebe would say, panache. Three examples: Erie K-5 engines covered the 830 miles between Jersey City and Marion, Ohio, without change; C&EI counted

Southern Pacific train 78, the *Del Monte*, bound for Monterey and Pacific Grove in October 1954, skirts the shore of San Fancisco Bay below Bayshore at Sierra Point. Stan Kistler

on 4-6-2s to rifle its *Zipper* between Villa Grove and Chicago Heights, Ill., 118.5 miles, in 102 minutes, start-to-stop, in 1939; and Louisville & Nashville ordered the only 12-wheel tender on the railroad to enable a Pacific to make the 205.5 miles from Nashville to Birmingham nonstop with the *South Wind* streamliner.

EARLY ECCENTRICITIES

Four-six-two: Those hyphenated digits postdated the advent of the wheel arrangement because Frederic M. Whyte didn't get his numerical system of locomotive description adopted by the Establishment until 1901, and initially even then minus the hyphens. But the 4-6-2, as it came to be known, first appeared in 1886. In Wilkes-Barre, Pa. In the shops of the Lehigh Valley. Beneath a twin-firebox Camelback numbered 444 and named *Duplex*. George S. Strong is credited with designing this formidable-looking, 138,000-pound creature, and a glance at the dual, marine-style corrugated furnaces behind its boiler explained its center cab and what *Railroad Gazette* interestingly referred to as pony wheels behind the drivers.

Experimental engines, unlike stage plays, tend to receive rave notices, and the *Gazette* gave *Duplex* its share. The drafting and production man-hours implicit in the striking page-wide, engraving of Strong's steamer evidenced the editors' enthusiasm. So cover with crepe the fact that the 444 was never duplicated and ingloriously ended life as a conventional 4-6-0, destroyed in a collision in 1898. Instead, recall *Duplex* barnstorming west out of Chicago in 1887. Entrusted with a nine-car, 510,000-pound train No. 1 of the Chicago, Milwaukee & St. Paul, the 4-6-2 managed (according to a *Gazette* correspondent who rode the pilot beam) to wheel that consist 23 miles in 22 minutes 59 seconds en route to Milwaukee. Ah, but the best was to come. Bound for Brainerd, Minn., on Northern Pacific, *Duplex* single-handedly lifted a 14-car, standing-room-only passenger train weighing 875,000 pounds up a 3-mile, 1.16% grade out of St. Paul — and two-thirds of the way upgrade, the engine blew off steam.

Lifted safety valves on 1.16% or no, polite society does not mention *Duplex* and Pacifics in the same breath. Nor does it like to recall Chicago, Milwaukee & St. Paul No. 796, the nominal Ten-Wheeler with an afterthought of a two-wheel trailer that Schenectady produced in April 1887. Let us concede that this engine was no more a Pacific than Santa Fe's No.

3829 of 1919 was a true Texas. But leave us remark that the St. Paul purchased three more such eccentricities in 1893, Rhode Island compounds Nos. 828-830; that one of them — the 830 — was displayed at the Columbian Exposition in Chicago, and that the specifications revealed that a consequential 18,000 pounds, or 13% of the total engine weight of 143,000 pounds, was supported by the rear wheelset. The 796 was modified into a 4-6-0 by its owner. Locomotives 828-830 were sold off to the Plant System in 1900 to work under palm trees as 4-6-2s until rebuilt as 4-6-0s by successor Atlantic Coast Line. Still, they were 4-6-2s. Weren't they?

ACL P-5-B No. 1676 flies white flags through Richmond, Va., in June 1949. This updated design with 69-inch drivers created a dual-service machine that was better suited for freight. ACL purchased 165 between 1922 and 1926. August A. Thieme Jr.

Which brings us to 1901 and Philadelphia, where Baldwin undertook the construction of 13 4-6-2s whose firebox width left no doubt that their trailing trucks were justified. More than that, Q-class Nos. 338-350 were thoroughly modern in the sense of piston valves actuated by Walschaerts gear. And they were destined to be durable, with a couple still in steam in 1957. Were these locomotives acclaimed for their novel wheel arrangement and christened Pacifics? They were not. Their originality was obscured by their gauge (3 feet 6 inches) and destination (New Zealand). Americans had to wait until 1902 — when Brooks delivered some spindly 4-6-2s to Missouri Pacific and associated St. Louis, Iron Mountain & Southern — to recognize and name the steam passenger locomotive wheel arrangement of the century.

ALL-AMERICAN ENGINE

America accepted the Pacific with alacrity. All those new Grand Centrals and Unions, 20-hour New York-Chicago schedules, and impending steel cars left no option but the 2-6-2 — and only the Atchison, Topeka & Santa Fe and the Lake Shore &

Five NYC Pacifics line up on multiple sections of train 26, poised to depart Chicago on a snowy day in 1924. Three years later, the venerable 4-6-2s would give way to 4-6-4 Hudsons. New York Central

Michigan Southern trusted Prairies at 80 mph.

Chesapeake & Ohio was on the heels of Mopac in acquiring 4-6-2s in 1902. Chicago & Alton, Northern Pacific, and Santa Fe followed in 1903. Add New York Central, St. Louis-San Francisco, Southern Pacific, and Union Pacific in 1904. Baltimore & Ohio, Erie, Louisville & Nashville, and Milwaukee (this time officially, with an elegant example — to quote the Railway & Locomotive Historical Society — built in its West Milwaukee Shops) were aboard by 1905. The Interstate Commerce Commission, which then tabulated locomotive ownership by wheel arrangement and frequency of steam usage, counted 2,195 simple and 45 compound 4-6-2s in the land as of June 30, 1911, vs. only 652 simple and 19 compound instances of the slower-off-the-mark 2-8-2. And the orders kept coming: 480 in 1911, 594 in 1912, 566 in 1913, 174 in 1914, 102 in 1915, 278 in 1916, and 342 in 1917.

Nashville, Chattanooga & St. Louis even had Baldwin elongate 4-6-0s into 4-6-2s, and Santa Fe condensed passenger Mallets into 4-6-2s, compliments which would be returned a generation later when the company shops of Baltimore & Ohio, Chesapeake & Ohio, and Frisco lengthened Pacifics into Hudsons.

If you would know the germination and blossoming of the Pacific, dwell on Fred Jukes' photo of a Harriman-style Pacific in full stride across snowy Nevada sage with the *Overland Limited* … the *Century* poised at La Salle Street Station, Chicago, in five sections behind as many Pacifics … Francis J. Cole's quantum-leap Alco 50000 of 1910, cited by Alfred Bruce, without elaboration, as "the first maximum 4-6-2" … the metamorphosis of the New Haven's I-4 engines during their two-decade rule of the carriage trade in nonelectrified territory (only their arch-windowed cabs recalled their ancestry) … and Santa Fe's 3500 class of 1914, the system's quaint last gasp of compounding (assuming that maintenance difficulties inherent in inside cylinders exceeded the profligacy of tossing steam up the stack after a single use).

SLOW START ON THE PENNSY

Paradoxically, the railroad that relied most heavily on the Pacific for top passenger duties, possessed the most famous class of Pacifics, and didn't authorize mass production of a Pacific replacement for service beyond catenary until the end of World War II . . . that railroad ignored the wheel arrangement when it was new. The Pennsylvania Railroad's first chief of motive power, Theodore N. Ely, had declared, "We think that every pair of drivers adds complications of machinery and friction," and his successors in the general offices at Broad Street Station, Philadelphia, parted with the redoubtable D-class 4-4-0 and the splendid E-class 4-4-2 as a

Harriman-style Pacific 2405 evelops Harriman head-end cars in smoke at Elko, Nev., in 1918 with Southern Pacific train 2. The distinctive Harriman-style equipment appeared on SP and Union Pacific. Fred Jukes

Four notable Pacifics

Some Pacifics became corporate signatures in chinaware, on timetable covers, or around the Christmas tree on tinplate trains. Four lend themselves for consideration:

Southern Railway's Ps-4 engines, in their final format (Elesco feedwater heaters, 12-wheel tenders, painted green with gold trim), raised the South again in the wake of the all-Pullman, extra-fare *Crescent Limited*. Camelot was a word much used to describe a presidential administration of our times. In a railroad context, Camelot occurred in Charlotte and Chattanooga, Alexandria and Atlanta, wherever the graphite faces of these ladies loomed into view.

Large, very large (333,830 pounds), Pacifics rendered Jersey Central larger than life — thanks to that colorful, pioneering acknowledgement of the economy passenger, the *Blue Comet*. The train, and the heavy-browed, wide-fireboxed Baldwin G-1 machines that pulled it, intrigued the Lionel Corporation, and, through its catalogs, boys of all ages. Not bad for a 693-mile railroad known to few but its commuters.

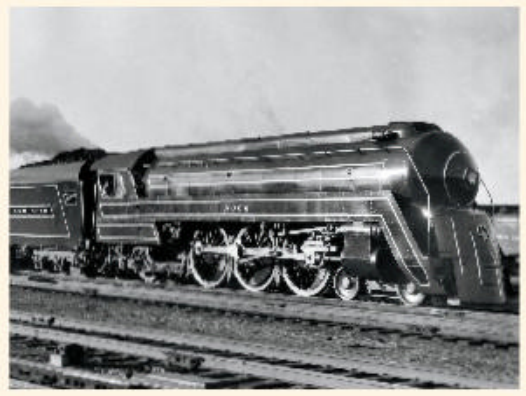
Ferocious: Is there a better word to paste on Chesapeake & Ohio's F-19, the Pacific with the top-to-bottom facade of starred and banded Elesco feedwater heater, bell, air compressors. and headlight? The *George Washington* engine, the engine at White Sulphur Springs in the publicity glossies, the engine sweeping past the Lincoln Memorial, Washington Monument, and Capitol in the painting.

And finally, the Presidents. Years after the fact, in a low-backed, walk-over, plastic seat of Budd's Rail Diesel Car demonstrator bound for Evansville, Ind., on the C&EI, a Budd technician with Baldwin credentials recalled Baltimore & Ohio's contract with Eddystone for 20 P-7 Pacifics. B&O wanted an engine just like Pennsy's K4, he said, only different — and to the degree that it was different, it wasn't as good. Perhaps. But attired in olive green and bearing Hail-to-the-Chief names on their cabside, they lent a style and substance to B&O's centennial when new in 1927 — and when diesels bumped them off the Royal Blue Line, four P-7 engines staged (to repeat an old line) a hell-bent-for-reelection campaign on the dawn-to-dusk Cincinnatian that got the West Virginia vote. — *D.P.M.*

Southern Ps-4 1415 rests at Ivy City engine terminal in Washington, D.C., in late 1940s. Leonard Rice

Jersey Central P47 833 works near Raritan, N.J., in 1952. Prevously these were in the G3s class. Classic Trains collection

Fresh out of the Huntington shop, C&O F-17 472 breaks in on a local at Athens, Ohio, in 1948. B. F. Cutler



B&O P-7 5303 steams *Cincinnatian* at its namesake before departure for Baltimore. Classic Trains collection

bachelor parts with his freedom.

Indeed, a generation of innocent train-watchers, dependent upon builder photos for its wisdom, may perhaps be forgiven for concluding that Pennsy's pre-eminent Pacific, the K4, was simply an enlarged E6 Atlantic. But the consensus of the experts (Bruce, Bert Pennypacker, Frederick Westing) was that the genesis of the Pacific of all time was an experimental one-shot import from the outback: K29 No. 3395, built by Alco's Schenectady plant in 1911. Very much a super Cole 50000, this monstrous machine had an engine weight of 317,000 pounds, which would not be equaled in its wheel arrangement on the PRR until the K5 of 1929. It was from the K29 that the K4 inherited its superheater, 27 x 28-inch cylinders, generous heating surface, and large grate area, albeit enveloped by the E6's lightweight rodding and the company's traditional Belpaire firebox.

(Poor Alco. It built nary a one of the Pennsy's 425 K4 engines, an exclusion prophetic of the time when the builder produced the prototype of the world's largest articulated for Northern Pacific, only to have Baldwin deliver all the copies.)

What were the applicable adjectives inspired by the K4 class in engines numbered from 8 to 8378 across four decades from Manhattan Transfer, N.J., to St. Louis Union Station? You didn't need Altoona test plant data to ascertain the answers. You needed only to be trackside or on red plush beside an open window of a P70 coach. Try elemental, indomitable, fast, inimitable.

The 150-ton locomotive matured without mechanical stoker or power reverse, and eschewed feedwater heater and booster. Her only nod to modernity seemed to be the *ding-ding-ding* of her electric bell clapper. Otherwise she was the sum of basics. One sensed not an inch or a pound of the nonessential. She accepted abuse, thriving in what a later generation would term the "red zone." Her 80-inch drivers had the adhesion to best the 1.86% ruling grade of the Pittsburgh Division, the diameter to exploit the flat tangents of the Fort Wayne Division, and the acceleration to shame replacement diesels in New York & Long Branch suburban service. And call the K4 broad-shouldered or square-hipped, she blended curves and angles and flat surfaces in a unique contour that preoccupied the canvases of Foster, Howard Fogg, Gil Reid, Albert O. Spencer, and Grif Teller, and the cameras of Charles B. Chaney, Alfred W. Johnson, and Don Wood.

Intellectual honesty obliges the question of why the Pennsylvania acquired a final 100 K4 engines in 1927-28, a purchase which forecast years of double-heading trains of a weight its rival dispatched behind single 4-6-4s. It remains a controversial call,

Santa Fe 4-6-2 3429 thunders east through Willow Springs, Ill., in January 1945 with a 13-car train 2, the *Scout*. Built by Baldwin during 1919-24, they were upgraded by Topeka Shops 20 years later. E. T. Hartley, Al Chione collection

influenced by the extension of electrification, the lead time involved in PRR development of new designs, and the system's aversion to following the crowd. However resolved, the issue was perhaps most poignantly illustrated in 1956, when the rider of a GP9-led TrucTrain observed in a Pittsburgh scrapyard a K4 and a New York Central J-3 Hudson . . . coupled smokebox to smokebox in a final embrace, after years of fighting the good fight, pilot beam to pilot beam, racing east from Englewood.

AMERICA'S 'PACIFIC RAILROAD'

All three steam standardization programs — the intramural designs of the Pennsylvania and Edward H. Harriman's Associated Lines, and the Government-authored blueprints of the United States Railroad Administration in World War I — incorporated the Pacific type. One inspired a "Pacific railroad": Atlantic Coast Line.

However handsome and mechanically sound, the USRA engines were not accorded a gracious reception. The trade press ridiculed the assault on customization; Delaware & Hudson's iconoclastic L. F. Loree denounced the trailing axles which compromised factors of adhesion; the Pennsy pointedly raised the headlights and replaced the radial-stay fireboxes of the 2-10-2s it was assigned; and the likes of Santa Fe and SP would have no part of Washington intervention.

Ah, but the South — the agrarian, still-getting-over-Gettysburg, somnolent South — loved the USRAs. Louisville & Nashville surrendered its soul to the Government locomotives, turning its back on company-built power in the process; and the Southern seconded it.

In a sense, though, the ultimate USRA conquest was the Atlantic Coast Line. ACL had given its name to the 4-4-2 type, but it gave its heart to a single USRA design: the light Pacific. The numbers tell the tale. Allocated 45 of the 81 examples built during Government control of the railroads, Coast Line continued to buy the design until it filled Nos. 1500-1569 of class P-5a. Still unsatiated, ACL settled on a near-duplicate, dual-service version (raising boiler pressure from 200 to 210 pounds and decreasing driver diameter from 73 to 69 inches) and ordered enough to occupy Nos. 1600-1764 in class P-5b.

These 235 members of the P-5 class, which con-

stituted a quarter of ACL's roster, were sufficient to monopolize the main lines of the Florida-focused, passengers/perishables-oriented 5,100-mile railroad . . . and that story remains without peer in Pacific annals. Interestingly, rival Seaboard Air Line and major connection Florida East Coast graduated from 4-6-2s to 4-8-2s early on. But not the carrier that called itself The Standard Railroad of the South. Not down the great double-track thoroughfare from Richmond south, not on the point of the *Havana Special*, not where ACL was in charge of taking you to where "Caribbean trade winds know not the calendar — they blow as cool in July as January."

And the Pacifics still were turning out ton-miles when the diesels usurped half the 4-6-2s' dual-service function. A Coast Line alumnus once recalled how, deep into EMD dominance, P-5 Pacifics would wheel four blocks of fruits and vegetables into Waycross, Ga., where the reefers would be doubled into two trains for movement beyond by an R-1 4-8-4 and a three-unit, 4,050 h.p. FT. (Oh yes, the dispatcher would release the 4-8-4 first, because even with water stops she could outpace the diesels.)

Introduction of the 4-6-4 and 4-8-4 in the 1920s, aided and abetted by 4-8-2 popularity, diluted Pacific production. The 4-6-2's *6* handicapped the wheel arrangement in the mountains and on tonnage; the *2* limited grate area and hence heating surface and horsepower. And passenger train-miles declined after 1926, reducing the need for varnish power.

Happily for train-watchers, these factors were either not apparent or deemed inapplicable at the time. The point is not that Pacifics spiraled in size until 1930, when the type peaked at an engine weight of 347,000 pounds in the Alco E-3 engines of the Chicago, St. Paul, Minneapolis & Omaha. These 4-6-2s, heavier than the first NYC Hudson, heavier even than the original American Mallets, steamed out of sight and mind on unremarked varnish in the corn belt.

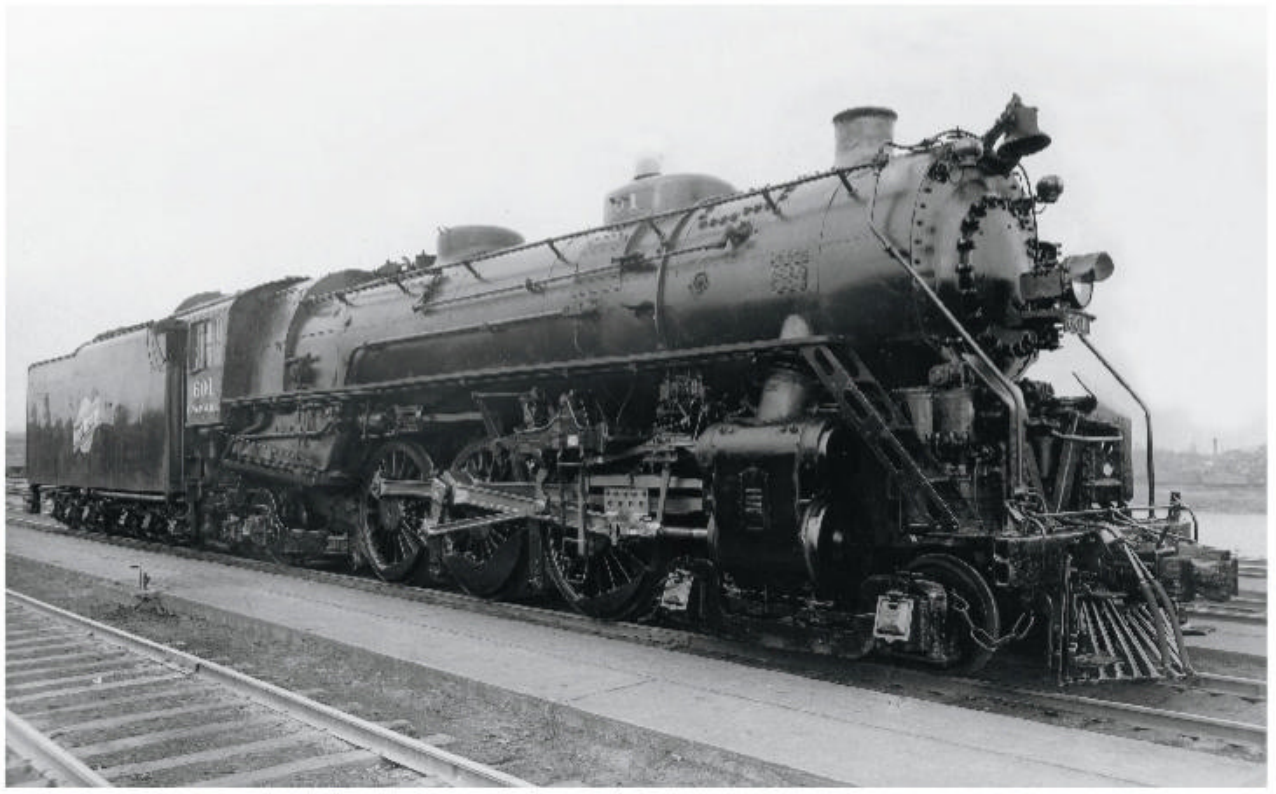
A PACIFIC POTPOURRI

Quite aside from World War II, when a jump in passenger road locomotives-miles from 360.3 million in 1940 to 477.1 million by 1945 implied its maximum utilization, the 4-6-2 type was accorded many curtain calls and on occasion delivered encores that improved upon the printed program.

For instance . . .

You'll never be able to isolate the digits in the mountains of data certifying the extraordinary utilization of passenger diesels, but Pacifics came off the bench to spell EAs, E5s, E7s, and DL109s on name trains short of their destinations to improve on turnaround times, *e.g.*, Washington, lnd.-St. Louis on B&O's *National Limited*; Valdosta, Ga.-Jacksonville on Southern's *Ponce de Leon*; Fort Worth-Dallas on Fort Worth & Denver's *Texas Zephyr*; and Waco-San Antonio on Katy's *Texas Special*.

There was a Presidential Pacific: Minneapolis & St. Louis 502. Long after declining passenger receipts and gas-electrics obviated the need for her wheel arrangement on the Peoria Gateway, President Lucian C. Sprague retained the 1921 Alco on the roster, posing her in the company of a Mike on a time freight for a color company calendar and assigning her to directors' specials.



Top: CStPM&O No. 601 is one of three in the E-3 class on the Omaha Road. They were built in 1930 at Schenectady. Above: C&NW E-2 No. 2908 sits at the north side of the Milwaukee station in the late 1940s. The railroad had 12 such locomotives, built by Alco in 1923. Two photos, CLASSIC TRAINS collection

Pacifics didn't lend themselves to resale — train discontinuances and diesels sealed off the market. There were only a few exceptions, as in Lackawanna to Boston & Maine; Great Northern to Atlanta, Birmingham & Coast; Pennsy to Norfolk & Western; Richmond, Fredericksburg & Potomac to C&O, and Western Maryland to Seaboard — and of course those Erie K-1 engines that went to Korea during the United Nations police action. But the odds didn't affect Florida East Coast (they never do, do they?), so in the aftermath of the collapse of the Florida Boom, those trim Alco 4-6-2s that had skimmed across the ocean to Key West found homes on Apalachicola Northern; Atlanta & St. Andrews Bay; Atlanta, Birmingham & Coast; Columbia, Newberry & Laurens; Georgia & Florida; Georgia Northern; Savannah & Atlanta; and U.S. Sugar.

The passenger competition and taut budgets of the 1930s invoked minor and major upgradings of Pacifics. None gave modernization a better shot than the majority Pacific owner (274 engines) of the West, Santa Fe. To compare before and after photos of its 3400-class machines, as built by Baldwin during 1919-24 and as rebuilt by Topeka Shops 20 years later, is to witness the wonders that could be

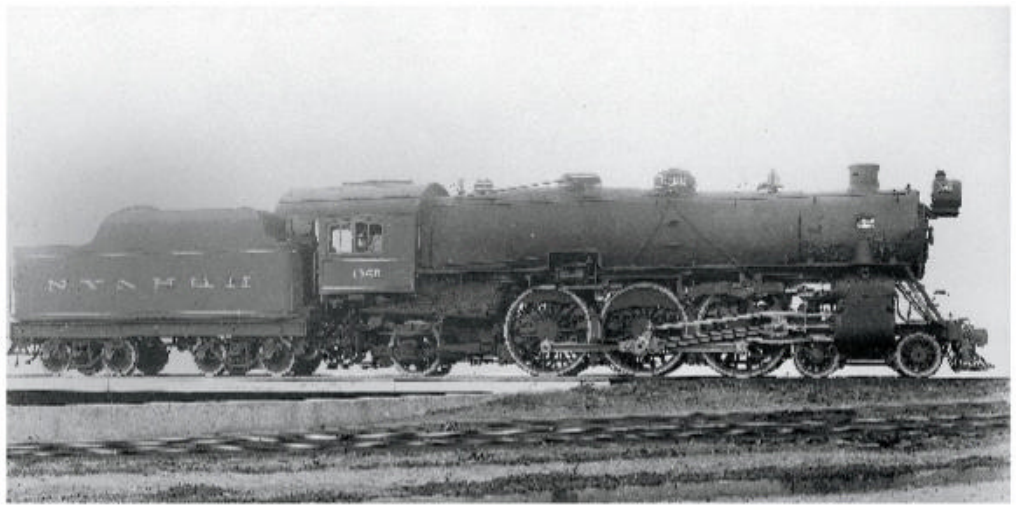
Born with three cylinders in 1925, the No. 6000 was rebuilt with Franklin poppet valves as a two-cylinder engine, fitted with roller bearings on all axles, and renumbered 6001. Missouri Pacific, W. M. Adam collection

wrought in steam without changing cylinder or boiler dimensions. What did change were boiler pressure (from 200 to 220 psi), driver diameter (from 74 to 79 inches), tractive force (from 40,800-40,900 to 41,400-42,200 pounds) and engine weight (from 288,000-310,350 to 312,000-326,200 pounds). And, of course, appearance. To see a recycled 3400 bearing down on you, stack extension raised, Boxpok drivers blurred, enormous tank (7,000 gallons of oil, 20,000 of water) behind her, was to witness a contradiction in the term *Pacific*. What she couldn't do with a heavyweight *Grand Canyon Limited* across the undulating Illinois Division wasn't worth postcard postage.

Pacifics were guinea pigs, as attest a record 325 psi pressure for a staybolted boiler on Delaware & Hudson 653 and the roller-bearing rods of Pennsy 20 and 5371 and Union Pacific 2906. But it is in valve motion that the wheel arrangement made its mark as a test bed. The faster an engine went, the more susceptible it was to innovative timing of steam events. It was only natural that the 4-6-2, which began life to the impulse of imported Krupp cylinders with unorthodox gear on LV's Duplex, and subsequently was reined by Stephenson, Young, Walschaerts, Baker, Southern, Caprotti, Dabeg, and you name it — that that type would wear Franklin poppet valves in steam's do-or-die charge into the jaws of death. Pennsy's criterion for the ultimate passenger locomotive was the ability to move 880 tons at 100 mph, and research toward that end included a contract to fit K4 5399 in 1939 with Franklin's Type A poppet valves with oscillating cams. The 5399 recorded 44% more drawbar horsepower than sister engines at 80 mph during runs that included reaching 94.7 mph with 1,000 tons and averaging 84.4 mph across 78.8 miles with a 940-ton *General*.

The other 4-6-2 which received Franklin's Type A motion was Missouri Pacific 6000, which began life as an Alco three-cylinder experimental in 1925; her early success (cresting 2% at 23 mph with 11 cars) was obscured by high maintenance costs. Later rebuilt with Franklin poppet valves as a two-cylinder engine, fitted with roller bearings on all axles, and renumbered 6001, the Pacific set a fast pace in the Ozarks.

Lucius Beebe delighted traditionalists when he focused his Graflex on an aging Burlington Route 4-6-2 helping the disabled diesel of the *General Pershing Zephyr* through Sheffield, Mo., and ran the photo in his 1940 book *Highliners* under the headline: "Get A Horse!" Chicago & North Western anticipated Mr. Beebe in January 1935 (and forecast Santa Fe's 3400-class rebuilding program) when it upgraded



Above left: New Haven I-4 No. 1360 is one of 50 Pacifics built by Alco in 1916. They were the top mainline passenger engines for more than 20 years. Alco Historic Photos **Above: Later modifications to the I-4 Pacifics included Elesco feedwater heater, air reservoirs atop the boiler, and 12-wheel tenders.** E. R. Meakes

four E-2 Pacifics into 79-inch-drivered, 225-psi, oil-burning steeds that condensed Chicago-St. Paul running time from 10 to 7 hours for a heavyweight *400* before Burlington and Milwaukee Road could launch their announced streamliners. Yet if streamlining, and diesels and new steam, quickly prevailed, *Official Guides* prove that for 4½ years an old iron horse would get you to the Twin Cities as rapidly if not as colorfully as its silver-and-orange competition.

Streamlining was synonymous with the diesel, and those who disagreed did not contest the point with new 4-6-2s. Only 20 Pacifics were built for service in this country after the *Zephyr*. Lima's finesse was evident in the 10 dual-purpose P-4-a and P-4-b machines delivered to Boston & Maine in 1934-35, uncommonly lithe for their size. Fitting indeed was the fact that the Reading concluded domestic Pacific production with 10 company-built class G-3 engines in 1948, thus allowing the Commonwealth of Pennsylvania to lay claim to having built the first and last of the wheel arrangement.

TO CAMP, COLLEGE, WAR, WORK

Pacifics permeated the lives of two generations of Americans. They took millions of us to camp and college, war and work. They delivered the mail. They were the aristocracy of the *20th Century Limited* and the bourgeois of the *Border Limited*. Their anthracite and bituminous and lignite and Bunker C smoke swirled across the green of coach plush and Pullman curtain. They held court over the bumper posts of South Station and Dearborn and 3rd & Townsend. They were responsible for that "bursting shell of sound" and that "trembling of the ground" when PRR 29 descended upon Winona Lake, Ind., and SR 36 seared the curves through Concord, N.C.

That is the Pacific legacy — not the admittedly intriguing minutia that they were painted blue, gray, green, and red as well as black, which they were; or that they mounted headlights high, off-center, centered, and low, which they did. Rather, the Pacific's hold on history is attested to in Railway Post Office cancellations that were stamped behind its tenders; in all the *Official Guide* agate train times it implemented from 4:25 a.m. in Vincennes, Ind., to 4:03 p.m. in Holland, Mich., to 9:31 p.m. in Fayetteville, N.C.; in being the primary agent in compiling those dusty statistics of, say, 1939, when the Class I railroads reported 390,883,000 passenger train-miles and 11,043,000 passenger train-hours in a year in which the railroads accounted for 67.7% of non-automobile passenger-miles in the U.S.

What the statistics imply is that the Pacific was a public machine, that it maintained a high profile long before the phrase was coined. Illinois Central Public Relations Director George M. Crowson was the first to discover and publish the depth of the public evaluation of the passenger train. IC was a pioneer in cleansing its timetable of branchline locals. But Crowson found that when the last passenger train left town, most of its citizens thought the railroad itself had been abandoned. He began a series of institutional ads in on-line newspapers to correct that impression.

The Pacific then, *was* the railroad for a couple of generations, certainly from the eve of America's entry into World War I until VJ Day. As the pre-eminent common carrier people-mover, the 4-6-2 trafficked in umpteen millions of miles however anonymously so in the sense of the majority who at their destination hurried without a glance past those wheels harnessed in four-six-two formation.

DAVID P. MORGAN joined the TRAINS *staff in 1948, became the magazine's editor in 1953, and retired from that position (as well as publisher) in 1987. He died in 1990.*

Minneapolis & St. Louis K1-32 No. 501 was streamstyled and remained on the roster for special trains long after motor cars had taken over regular passenger duties. M&StL

DULUTH & NORTHEASTERN The engineer and fireman are snug in the cab, but a member of the train crew is out in the cold on the footboard of Duluth & Northeastern 0-6-0 No. 29, switching at Cloquet, Minn. on Jan. 26, 1962. The 11-mile short line remained committed to steam until problems with parts availability forced a switch to diesels in 1964. It acquired the 0-6-0, built by Lima for the U.S. Army in 1944, in 1956. The six-wheeler previously worked at Toledo's Bay Terminal Railroad and is now at Prairie Village historical site near Madison, S.D. Philip R. Hastings

WESTERN MARYLAND Exuding power, WM H-8 Consolidation 776 crouches menacingly on the turntable at Elkins, W.Va., one night in the early 1950s. Built in 1914 with drivers just 52 inches in diameter, the 244,500-pound behemoth packed 61,400 pounds of tractive effort; coal drags through tortuous Black River Canyon east of here required up to 10 of these engines. Western Maryland's ultimate 2-8-0 was the 285,600-pound H-9 of 1921 whose 71,500 pounds of tractive effort eclipsed many 4-8-4s. W. A. Akin Jr.

FROM
OCTOBER
1977
TRAINS
MAGAZINE

A FIREMAN ON A PRR LOCAL FREIGHT HAS HIS HANDS FULL WITH A CREW OF "MORAL UNDERACHIEVERS"

FOUR FOR Eastbound

By **Lloyd Arkinstall**

During the winter of 1942, I was nominally in charge of combustion on a local freight — the "Afternoon Amboy Peddle" — out of Waverly Yard, Newark, N.J., on the Pennsylvania Railroad's New York Division. By the very nature of their makeup, "peddles" provided a climate for crew cohesiveness not possible on other types of engine jobs.

Make no mistake, firing on passenger trains — if you were sufficiently moss-covered to hold such a job regularly — gave the exhilaration of speed; ensured a regularity of schedule; and possessed a glamour that stimulated the purchase of white engine caps. However, there was little time for social intercourse. Garrulity in passenger service was discouraged; and once you were under way, the noise level dictated that most routine cab communications be by pantomime. Further, engine crews had little on-the-job social contact with passenger trainmen. Engine-crew assignments originated and sometimes terminated at enginehouses, usually in the hinterlands well separate from train-crew facilities. Similarly, yard jobs seldom placed you distant from a dunnigan or hump shanty, toward which the train crew would gravitate during lulls in the action. Hence engine crews and train crews mingled little during off moments.

On peddles, however, the enginemen really got to know their conductor, flagman, and head brakeman. Local freight engine and train-crew assignments had a common point of origin, a regular cabin, and — most important — mobility, which provided escape from the yardmaster's bullhorn.

The Afternoon Amboy Peddle regularly had assigned to it an H6 Consolidation from the Eugene Debs era because of the 2-8-0's blind center drivers and capability to negotiate tight sidings. My sole grudging concession to this venerable class of hog was to acknowledge its tracking quality at speed, which I felt was superior to that of the later H9 class. Any further favorable comparison would be at best irresponsible. Our four-wheel hack embodied so little of a metallic nature that the company of a standard eight-wheel freight car was required to trip a signal circuit.

The Amboy Peddle would leave Waverly in the afternoon and often would return about a shadow's length ahead of the "hog law." In those days it was deemed perfectly reasonable for a crew repeatedly to work 16 hours at a stretch, provided an 8-hour interval occurred. So late each weekday afternoon, the operator at Lane Tower would with trepidation "open the gate" and expose his busy interlocking to the passage of our antique roadshow. Despite his fears, to stay our departure would have bordered on the unpatriotic; for during this first full year of American participation in World War II, the more florid journalists were telling us that "the slumbering American industrial giant was aroused and would again fast become the arsenal of democracy." The Amboy Peddle would answer the call.

The next operator westward to wish us Godspeed through his interlocking — Elmora Tower at South Elizabeth, where the four-track main widened to six — was a fellow townsman named Smithe. This gentleman was a Renaissance man who molded and hand painted bas-reliefs of The Last Supper. Smitty would come out on his tower stair landing and swing us an encouraging highball, to which I would respond with the deck broom.

Our slim-stacked, tall-domed scaldpot, enthusiastically trailed by a half dozen cars and our wildly gyrating four-wheel cabin, would rocket onward to Union interlocking at Rahway. We went right down the middle of the hottest, biggest-time, highest-density fairway in the land. This was heady stuff. The Union Tower operator would check our headlong rush with a medium clear on the home board and divert us through the short tunnel onto the Perth Amboy Branch; he was secure in the knowledge that by the time we returned we would be the problem of his relief man.

The props of this tale — machines — were at times fallible. But the machines were not nearly as fallible as the crew members, who were moral underachievers.

Although he was quiet-spoken, our muscular captain had an aura of lethal potential — there was something about the irises of his eyes that bore a resemblance to those on the Post Office "wanted" bulletins.

'BLUENOSE' AND HIS MISFIT CREW

Our regular conductor, Bob "Bluenose" Bolter, ran a taut ship. Although he was quiet-spoken, our muscular captain had an aura of lethal potential — there was something about the irises of his eyes that bore a resemblance to those on the Post Office "wanted" bulletins. His

Conductor Bob "Bluenose" Bolter marked off the Afternoon Amboy Peddle on Wednesdays.

Brakeman Tim Duffy, a "one-man survival unit."

Man behind the ominous lantern, catenary boss Tom Shawn.

Pennsy's Amboy Peddle prowled the industrial districts along the North Jersey coast, much as this H6 Consolidation is doing at Kearny, N.J., in July 1941. Herb Weisberger

H6sb No. 3042, standing on the ready track at Meadows, N.J., in June 1946, was typical of the veteran engines normally assigned to the Amboy Peddle. George B. Ritz

The "Rule G slashers" on the peddle's crew were (from left) engineer Bob Mallory, flagman (Wednesdays only) Happy Hayden, and flagman/conductor Joe Coffin.

sole departure from total deportment had Robin Hood overtones: He would deposit an occasional bushel of pilfered anthracite at a "widder woman's" humble dwelling near the Woodbridge freighthouse.

Our engineman, Bob Mallory, would challenge subtler descriptive powers than mine. Except for chronically appearing to have just been awakened from a park bench, Bob's more prominent features were a ram jaw and a bulbous nose astride which were horn-rimmed spectacles, all looming beneath a much-thumbed cap visor. However, his essence was memorable; he was without malice, and he cheerfully forbore the worst that weather and railroading conspired. But Bob was addicted to massive infusions of Old Overholt rye, a beverage with surprising clout.

Joe Coffin, our overweight flagman, was similarly afflicted. He too, with or without stimulant, abounded in bonhomie. Rounding out the crew was Tim Duffy, a hatchet-faced ex-yardmaster who had absorbed his quota of abuse in that unloved post and had exercised his seniority to become our head brakeman.

I soon learned that the presence of Bluenose Bob provided the fine line in our crew which separated law from anarchy. Each Wednesday, Bob would mark off to formally visit the "widder woman" whose kitchen range he supplied with purloined coal. On these evenings on the peddle, Rule G would be forgotten. Joe Coffin would conduct and an equally bibulous ex-boomer named Happy Hayden would flag; this left Tim Duffy and me as the sole abstainers.

On such nights, all would go well until around 10 p.m., when we would tie up at Hall Avenue in Perth Amboy to eat. The engineman ostensibly would stay with the H6 while the rest of us would wind our way through a maze of alleys and board fences to the back door of a closed beanery. Our coded knock would be answered by a sleepy functionary who would pause in his sweeping and swabbing while we kicked together a meal. Acting conductor Coffin would substitute for the counterman with extraordinary flair. Although the caper seemed furtive and clandestine, it was completely honorable; and upon departure we would scrupulously leave our quarters, dimes, and half dollars with the sweeper.

If upon boarding the engine I would find Mallory softly humming a medley of gospel hymns and music-hall bits, I knew that the fermentation process was well under way.

Our return would follow the same alleyway maze. Just beyond the crossing where our engine slumbered, a malfunctioning neon tavern sign guttered fitfully in the night. If upon boarding the engine I would find Mallory softly humming a medley of gospel hymns and music-hall bits, I knew that the fermentation process was well under way.

Our itinerant drilling would continue in an increasingly casual fashion. Drawheads and draft gear withstood frightful impacts. Looking back now on those nights, bizarre vistas come to my mind: an unopened lumberyard gate disintegrating under the passage of a kicked car; a rumbling avalanche of a kiln-works' carefully stacked firebrick, triggered by zero clearance.

Firing under these conditions required mongoose-like reflexes to survive the constant buffeting between coal gate and backhead, and my undying gratitude went out to the Pennsy designer who created the horizontal backhead grab iron. At times, all three Old Overholt enthusiasts would convene in the cab and — until I convinced them that in addition to possessing the sensory shortcomings of the three proverbial monkeys who witnessed no evil, I also lacked a sense of smell — my fending off of their proffered pints came to verge on the physical.

THE 'TEMPERANCE TWINS' TAKE OVER

Hours after No. 701, the Bay Head "owl," had blasted by, our drilling would reel to a concussive end. The time had come to head for the barn, and thus it also was time for the "temperance twins" — Tim Duffy and me — to take over. By bitter experience, Tim had evolved into a one-man survival unit. He would come forward to report that the roistering hind-end crew, upon re-entering the cabin (which Tim kept hotter than hell's arch bricks), had been suffused with drowsiness and had corked off on the cushions.

The first Wednesday night Tim had come forward with this message, I had looked over at the euphoric lump on the right-hand seatbox. Mallory no doubt was dreaming of his own Big Rock Candy Mountain where the springs bubbled Old Overholt and the callboys were hopelessly lost. For the sake of everyone's well-being, I asked, "Tim, can you handle a scoop?"

He replied that he frequently had spelled the "Back Road" job's fireboy "just for the hell of it" and could "muddle through." So while acting conductor/fireman Duffy cranked a roadside telephone for clearance, I knocked the fire into road readiness. Then with a filial armlock on my unresisting engineman, I eased him toward my seatbox, appealing to his innate fair play with, "Bob, how will I ever make engineman if you weld your butt to that righthand box?" In minutes he resumed his 80-proof slumber.

Duffy's lantern called for a hasty standing brake test; and by the time he had reached the engine, the beady-eyed dwarf signal had raised from the horizontal, loosing our aggregation onto the eastbound main — undermanned perhaps, but sober. Under more legal auspices, my impromptu "promotion" to engineman would have been an event of considerable satisfaction. However, my joy was not unalloyed, for our clearance contained a slow order from Avenel to Rahway Junction. This suggested an abnormal condition; and since abnormal conditions attract officialdom, my cargo of slumbering Rule G slashers weighed heavily on my mind.

On the long drift downgrade from Avenel to Rahway Junction, Duffy — by wanton use of the blower — managed to barrel up our relic for the impending climb onto the main at Union Tower. As we rounded the Reformatory curve, my sense of foreboding went into full gear, for the highway bridge was silhouetted by emergency floodlights. With the inevitability of doomsday, an official's lantern invited us to close in on the home signal.

As we clanked nearer and the floodlights took on a garish, third-degree intensity, my whole railroad career — all six months of it — passed in review. Suffused with bitterness, I cursed Bluenose Bob, our father figure, for his absence. Why couldn't he pursue his lusty drives on the Sabbath, when the job marked off?

Less than a hundred yards remained, and I strained to identify the lantern-swinging official. Duffy doused the deck light, closed up the rear of the cab, bodily filled the right gangway, and said, "Talk up a storm. We've got to keep this guy on the ground."

As I resignedly closed the throttle and applied the brakes, a trailing wind momentarily enveloped the approaching official in our smoke. The smoke cleared, and directly below the cab, to my indescribable relief, stood old Tom Shawn, the catenary boss, himself possessed of a "hollow leg." He squinted up from beneath his battered Yaphank campaign hat and boomed, "Low wire … cleared up now … get the board … go!"

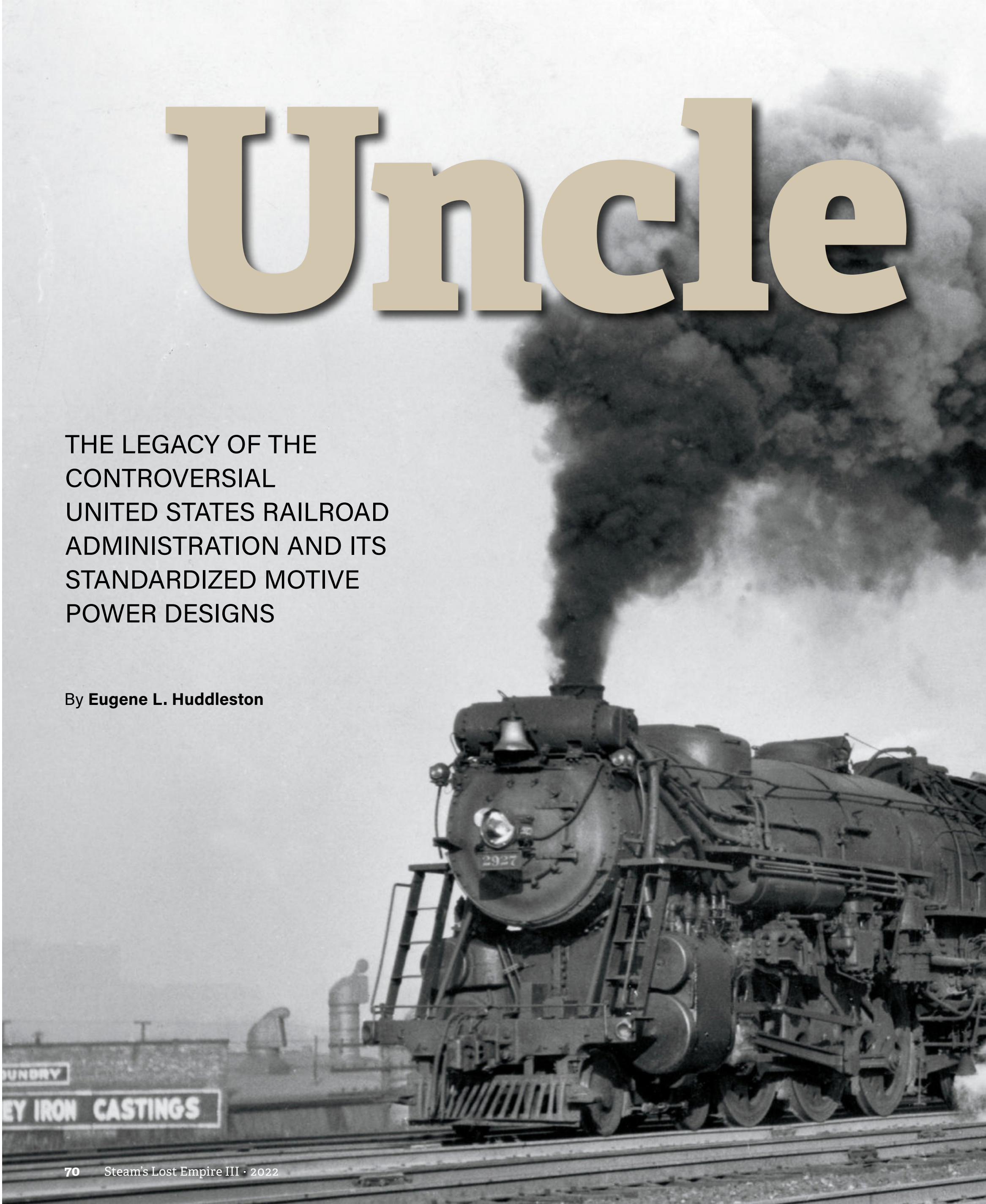
The home signal cleared. In my haste to vacate this perilous spot, I wrongly tugged off five shrill whistle screeches to recall our nonexistent flagman; acknowledged his equally nonexistent highball; and dug in on sand. My engineman stirred slightly and mumbled, "It's four for eastbound." ■

LLOYD ARKINSTALL was a PRR fireman from 1942 through 1950, with two years out for war service with the Navy, then made a career as a commercial artist practicing in New York City. He was one of the founders of the Black River & Western tourist railroad in New Jersey. The vignettes in this story, the first of five to appear in Trains *during 1976–82, were recorded on tape and transcribed during 1972–73 by the late Bill Withuhn and his wife Gail. Arkinstall died in 1992.*

Uncle

THE LEGACY OF THE CONTROVERSIAL UNITED STATES RAILROAD ADMINISTRATION AND ITS STANDARDIZED MOTIVE POWER DESIGNS

By **Eugene L. Huddleston**



FROM
MARCH
1991
TRAINS
MAGAZINE

Sam's LOCOMOTIVES

Erie 4-6-2 No. 2927 works on train 624, the *Washingtonian*, at East 70th Street in Cleveland. Richard J. Cook

Even though the United States Railroad Administration (USRA) disappeared in 1920, mention of it arouses controversy today just as it did on its founding Dec. 28, 1917. It was bound to be so. USRA was created as a wartime agency to preside over the nationalization of American railroads. As such, it entailed federal management, operation, and financing of the privately owned railroads. The USRA arbitrarily reduced the number of passenger trains, established common ticket offices and terminals, standardized rolling stock, utilized the shortest routes, and increased wages and freight rates. In so doing, it incurred a deficit of nearly $1 billion.

Many historians believe the agency was a success for keeping shipments moving, alleviating equipment shortages, and unclogging congestion at coastal terminals. Nevertheless, the argument over whether the USRA was necessary or too costly has never been settled. Much controversy over the USRA was politically inspired. Woodrow Wilson, the Democratic President who created the USRA, had won a second term in 1916 on the slogan, "He kept us out of war," and had triumphed over the majority Republican party only because of its weak candidate, Charles Evans Hughes. Further, Wilson — by promoting an income tax, banking reform, and antitrust legislation in his first term, and introducing the eight-hour workday in his second — could hardly expect the backing of powerful, monied interests.

Adding to the controversy is the fact that William G. MacAdoo, whom Wilson selected to run the USRA, had married the President's daughter two years after entering the Wilson Cabinet as Secretary of the Treasury in 1912. MacAdoo, a banker in private life, had financed and built the first tunnels under the Hudson River into Manhattan, used by the Pennsylvania Railroad's Hudson & Manhattan subsidiary. Because of his association with reforms such as the Federal Trade Commission and the Federal Reserve System, MacAdoo remained controversial throughout Wilson's tenure in office. MacAdoo resigned from government service in December 1918 and was replaced as USRA director-general by Walker D. Hines, who served until the railroads were returned to the control of their owners on December 14, 1919. (The official end of the USRA came with passage of the Transportation Act in March 1920.)

Against the controversy surrounding the USRA, it's useful to examine one part of it where objectivity can quell controversy and where confusing statistics can be sorted out. That part is the government's production of nearly 1,900 locomotives for America's railroads in 12 different types. Using comparative data from locomotive histories and a government publication of 1920 entitled "Comments and Criticisms of Government Locomotives," one may at least partially settle the overall controversy surrounding the USRA. Examined will be the selection, construction, and performance of the two types that by virtue of historical development and contemporary evaluations became the most controversial. Also examined are cost and quality factors suggesting whether taxpayers were getting their money's worth and whether greed had intruded into the program for standardized locomotives. Whether the USRA engines actually helped alleviate the domestic locomotive shortage is a point that cannot be argued here, for the war was over only four months after the first locomotive, Baltimore & Ohio light 2-8-2 No. 4500, was ready for service on July 4, 1918.

Chicago & North Western M-3 class 0-8-0 2617 steams a local at Grant Street in Milwaukee on Feb. 20, 1947. The popular USRA 0-8-0 design is based on the C&NW M-3 class. While only 175 USRA 0-8-0s were built, more than 1,200 copies were later produced for 50 railroads after USRA control ended. A. Schlook

TWO COMMITTEES

In selecting the types of locomotives to build, the USRA relied on two committees, whose work could not get underway until February 1918. (The government did not take over the railroads until late December 1917, nearly nine months after the U.S. entered the war.) The Builders' Committee was composed of ranking mechanical officers of the chief locomotive builders — American, Baldwin, Lima, and H. K. Porter — with most of their work being done in Washington and Philadelphia. The Railroad Committee, in final makeup, had officials representing the mechanical departments of 14 carriers. It is difficult to sort out the responsibilities of the two committees; basically, the Builders' Committee decided on the types to be built and drew up the plans, and the Railroad Committee (also referred to as the Engineering Committee) added the "specialties" and made sure the designs conformed to weight, clearance, and safety requirements.

For the Builders' Committee to design, as it did, 12 different types (in six classes and eight wheel arrangements) would have seemed wise if the war had lasted longer. But the Armistice occurred only four months and seven days after the first USRA locomotive appeared, an eventuality that of course could not be foreseen. As it turned out some USRA locomotives were not delivered until a year after the war had ended. Initially the Builder's Committee recommended only four classes: light and heavy 4-6-2s (or Pacific types), 2-8-2s (Mikado), 4-8-2s (Mountain), and switchers (0-6-0s and 0-8-0s). The 2-6-6-2 and 2-8-8-2 Mallets and 2-10-2s (Santa Fe) were later additions.

In retrospect, a single type — a light 2-8-2 — would have sufficed. New York Central President A. H. Smith, an advisor to the USRA, had actually proposed a fleet of 1,000 light Mikados to be kept in a national pool for transferral from railroad to railroad as needed. The only justification for eight different wheel arrangements when simplicity that would promote expediency was dictated, was to set a national policy in locomotive design and procurement for years to come. This conformed with the Wilson administration's efforts to legislate a postwar national transportation policy, an effort which led only to the ineffective Transportation Act of 1920.

Consuming both time and money was the fact that both committees had demanding constituents to please. The Builders' Committee wanted high boiler horsepower, but

Southern 0-8-0 No. 1868 steams at Appalachia, Va., on May 27, 1952. The USRA 0-8-0 became the Southern's standard heavy-duty yard goat, assigned class As-11. Twenty were assigned during WWI; they were so successful that nearly 50 more were ordered between 1918 and 1926. Ed Theisinger

they had to work within rather severe clearance limitations, weight restrictions, and even fuel grades. The Railroad Committee had to consider the comfort and safety of the crews. In an address before the Brotherhood of Locomotive Firemen & Enginemen, George DeGuire, general supervisor of equipment for USRA, outlined the directives on safety given the Railroad Committee. Besides equipping the locomotives with the latest "specialties" to make them as "modern" as possible, the committee was to consider the comfort of engineer and fireman and the elimination of arduous manual labor through the use of pneumatic firedoor openers, power reverse gears, and mechanical stokers for locomotives with firing rates of more than 4,000 lbs. per hour. They were also instructed to provide two water glasses (as a check on each other), gauge-cock water columns, well-placed cab lights, pneumatic bell ringers (permitting mounting of the bell on the brow of the smokebox well within vertical clearance limitations), and power grate shakers (not very practicable, as it turned out). In the tenders of the hand-fired locomotives (switchers and light 4-6-2s) were coal pushers. Between engine and tender were radial buffers and double-strength pipes and flexible joints instead of hose connections for train brake and signal lines. DeGuire rightfully pointed out that these and other advances in safety (like live steam pipes kept outside the cab) placed the USRA in the forefront of progressive design practices.

In settling on 12 types of eight wheel arrangements rather than on a pool of 2-8-2s, the Builders' Committee was trying to please everyone, for the wheel arrangements selected — except for the 2-8-8-2 — corresponded with the most popular types ordered domestically in 1916. These, listed in order of approximate number built, were: 2-8-2 (731); 0-6-0 (402); 2-10-2 (315); 0-8-0 (302); 4-6-2 (287); 4-8-2 (182); and 2-6-6-2 (135).

In general, all eight USRA wheel arrangements covering switching, freight, and passenger service performed well. But in retrospect, some designs were not needed, even if the war had lasted considerably longer. Postwar analysis would reveal that probably the light Mallet (2-6-6-2) and both the light and heavy 2-10-2 types should not have been built, the 2-10-2s because of the problems inherent with the wheel arrangement and the 2-6-6-2s because of their poor reception on the roads that received them.

2-10-2 PROBLEMS

As a wheel arrangement, independent of its selection by the USRA, the 2-10-2 had some major problems. The Atchison, Topeka & Santa Fe about 1902 had developed it as one of those mechanical marvels that were popular at early world's fairs, specifically the St. Louis Exposition of 1904, where the huge machine with its tandem-compound cylinders was displayed. The Santa Fe type did not become practical until about 1915 by the use, in locomotive authority Alfred Bruce's words, "of the inverted-rocker centering device on the leading truck and by the application of the lateral-motion device to the first two pairs of

USRA standard locomotives

12 designs, 8 wheel arrangements

0-6-0 Chicago Junction 221 is a USRA 0-6-0 switcher. A total of 255 were built by Alco and Baldwin. Alco, C. W. Witbeck collection

0-8-0 New York Central 415 is a USRA 0-8-0. Only 175 were built during USRA control, but another 1,200 copies were built for 50 railroads. Alco

Milwaukee Road No. 359, a USRA heavy Mikado, as it works a freight bound for southern Indiana at Bellwood, Ill., on the Indiana Harbor Belt on Dec. 16, 1951. George Krambles, Krambles-Peterson Archive

drivers." Thereafter the 2-10-2 became popular for roads wanting lots of tractive effort under one boiler but not wanting compound articulateds. (At that time the simple articulated had not been developed.)

According to Bruce, the 2-10-2 lost out in popularity after 1920 for two principal reasons. Maintenance costs were excessive because the bolted, built-up frames of the time were loosened by the enormous force and weight of the side and main rods. And, it was impossible to counterbalance these forces with the area provided by the maximum driving-wheel diameters (63 inches) then practicable for the type. Notwithstanding these problems, some 2,200 2-10-2s were built in the U.S.

The USRA could not have known that the 2-10-2 would reach its zenith shortly after it was adopted as a standard type. Obviously the 10-coupled freight locomotive did not die, for in the late 1920s it evolved into the 2-10-4, which in its Super Power manifestations represented the highest achievements in power of the two-cylindered locomotive. But most of the 2-10-4s of 1930 and later had two important features all 2-10-2s lacked: cast frames integrated with the cylinders, and 69-inch or more drivers, permitting counterweights of adequate size for balancing the wheels with the weight of the main and side rods.

While there might be justification for the USRA adopting a light 2-10-2 (for those roads needing maximum starting tractive power but limited by weight restrictions to light axle loadings), there appears to have been little need for the heavy 2-10-2. The heavy Mallet (2-8-8-2) could have taken its place, and there would have been no frame problems, although the counterbalancing conundrum would have been only partially solved. Because vertical and horizontal dimensions were identical for the two types, roads stabling one could have stabled the other, although turntables might have come up too short for some roads with the 2-8-8-2.

Despite the problems inherent with the wheel arrangement, USRA built 175 heavy and 94 light 2-10-2s. Of these, 125 heavies went to the Pennsylvania's Pittsburgh, Cleveland, Chicago & St. Louis (PRR class N2); 5 each to the Colorado & Southern, Frisco, and Bessemer & Lake Erie; 10 to the Burlington; and 25 to the Erie. After the war, copies went to the Illinois Central, Central of Georgia, Missouri Pacific, Atlantic Coast Line, and Chicago & Illinois Midland. None of these roads except the Erie was ever noted for its Mallets. The light 2-10-2 went to the Ann Arbor (4), Chicago & Western Indiana (5), Duluth, Missabe & Northern (10), Boston & Albany (10), Seaboard Air Line, and Southern (50), again roads that generally eschewed Mallets.

The argument here is not that the USRA heavy 2-10-2 was unsound in design. In fact, it resembled closely several outstanding contemporaneous 2-10-2s. Linn H. Westcott, in Kalmbach's *Model Railroader Cyclopedia Volume 1: Steam Locomotives* of 1960, attributes the design to the AT&SF 2-10-2 built by Baldwin in 1915. Other possible candidates, because of closely or corresponding major dimensions, are Erie's (Alco, 1915) or B&LE 521-525 (Baldwin, 1916). Neither can one rule out Wabash 2501-2525 (Alco, 1917), nor Colorado & Southern 905-909 of 1914 and Denver & Rio Grande's of 1916. Even though the USRA heavy 2-10-2 was outweighed by the Pennsylvania N1 2-10-2 of 1918, as well as the Santa Fe, D&RG, and Erie designs, the trade magazine *Railway Age* believed there probably had been no other 2-10-2 "of better balanced design from the standpoint of boiler capacity."

The problems which the railroads reported to the USRA were inherent in the wheel arrangement. The light 2-10-2, with 57-inch drivers and about 5,000 lbs. less weight on drivers than the heavy, got complaints centering on both characteristics. In both the

2-8-2, LIGHT B&O 4500, sister to 4531, was the first USRA locomotive built. All USRA 2-8-2s had Walschaerts valve gear. Classic Trains collection

2-8-2, HEAVY Chicago, Milwaukee & St. Paul 8600 is a USRA heavy 2-8-2. More than 700 copies were built after USRA control. Alco, C. W. Witbeck collection

Grand Trunk Western S-3-c 2-8-2 No. 3749 arrives at Durand, Mich., from Pontiac in August 1959. There were 58 S-3 class 2-8-2s on the GTW and fellow CN subsidiary Grand Trunk. GTW steam was among the last running in the U.S., ending in March 1960, and drew railfans from all over to Michigan. J. David Ingles

Ann Arbor's and Seaboard's experience with light 2-10-2s, slipperiness was a problem. The factor of adhesion (at 3.97) was "too low" according to the SAL. The railroad further believed that the 57-inch drivers, the smallest on any USRA road locomotive, were "too small for fast-freight service." Boston & Albany had two complaints: frequent derailments (remedied by the railroad increasing the load on the pony truck and by "removing the coils of the trailer centering springs"), and the second, sharpening flanges, which B&A believed could be remedied by lateral-motion driving boxes.

Complaints about the heavy 2-10-2 naturally included the long wheelbase: the PRR noted excessive wear on the front and rear drivers. The USRA countered that there should be no problem with the flanges, for the locomotives were designed to take 19-degree curves. The Burlington reported — as one might expect from inherent limitations of the wheel arrangement — that the excessive dynamic augment on its 2-10-2s was due to "reciprocating parts too heavy" — the heavy rods required by the long wheelbase.

Bessemer & Lake Erie thought its heavy 2-10-2s could be more powerful. Before receiving the government models, B&LE had its own Santa Fe types of 1916, which at delivery were the second-heaviest nonarticulated locomotives in the country. Saddled with few weight restrictions, B&LE could take heavier than average axle loads: more than 66,000 lbs. vs. 60,000 for the USRA version. Heavier weight and smaller drivers (60 inches vs. 63) therefore gave the 1916 2-10-2s more tractive effort, a fact the Bessemer noted in its report to the USRA.

It would be misleading to claim that the USRA 2-10-2s had no redeeming qualities. "First class in every respect," commented St. Louis-San Francisco, quite pleased with the performance of its heavy 2-10-2s. West of St. Louis, the Frisco had a heavy grade requiring a helper, to which duty in 1910 was assigned the very first 2-8-8-2 Mallets built by American. Its five government 2-10-2s, originally intended for the Chicago & Eastern Illinois, undoubtedly supplemented or replaced seven of the slow, inefficient 2-8-8-2s. Because there was no real basis for comparison, the 2-10-2s easily earned a reputation with the road as thoroughly modern power.

The Pennsylvania, which seldom had more than 10 articulateds around at a time, obviously preferred 10-coupled locomotives, having purchased several hundred 2-10-0s during 1916-23 and owning more than 60 2-10-2s of its own design (assigned to the lines west of Pittsburgh) besides the USRA models. The motive power officer of the Pennsy, commenting on the performance of

2-10-2, LIGHT **Boston & Albany 1105 is a light 2-10-2. Only 94 were built under USRA control. All USRA 2-10-2s had Southern valve gear.** Classic Trains collection

2-10-2, HEAVY **PRR 9858 is a heavy 2-10-2. The type was considered the least effective of the USRA designs.** Classic Trains collection

Seaboard Air Line 2-10-2 NO. 2492 rolls downgrade with train 48 between Cedartown and Rockmart, Ga., in March 1948. The USRA assigned this group of 15 locomotives, Nos. 485-499 (later 2485-2499), to the SAL in 1919. The railroad also had 10 Baldwin-built 2-10-2s delivered 1918, Nos. 400-409 (2400-2409). D. W. Salter

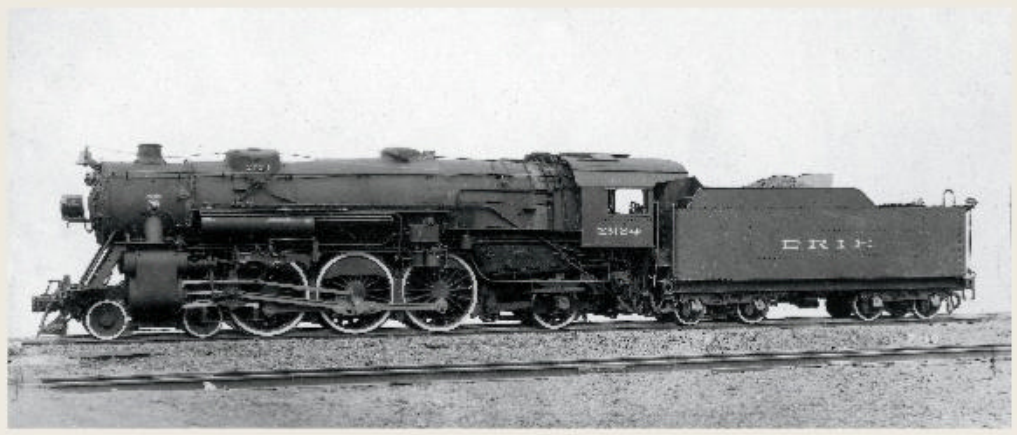
the USRA heavy 2-10-2s, must therefore have been accustomed to excessive tire wear, for he found that after rating the engines "in accordance with their tractive power," they "handled their tonnage in a satisfactory manner."

B&LE, despite emphasizing lower calculated tractive effort on the USRA 2-10-2s than on its own, nevertheless wrote: "We have had no trouble with this equipment chargeable to design, character of material, or make of specialties." And "very satisfactory" were the words both the Southern Railway and the Belt Railway of Chicago (Chicago & Western Indiana) used to describe their light 2-10-2s. Colorado & Southern's observation that the USRA heavy Santa Fe "compared favorably" with its own is not surprising, because they were quite similar in design. In fact, the C&S 2-10-2 of 1914 was a possible model for the USRA heavy Santa Fe. The faults, then, with the light and heavy government 2-10-2s were not the result of poor design or workmanship or defective material; rather it was the inherent problems of the wheel arrangement. Clearly the USRA could have met the varied needs of American railroads during World War I without the 2-10-2.

2-6-6-2 TROUBLES

Even less impressive than the 2-10-2 was the USRA light Mallet, the 2-6-6-2. Mallets, named after their Swiss inventor Anatole Mallet, had been introduced into the U.S. in 1904 in the form of an 0-6-6-0 pusher for the B&O. Two engines under one boiler with the steam used over again in the front engine was a concept that really worked. By 1918, Mallets had become about as big as conventional steam locomotives would ever get: into the Erie's and Virginian's Triplexes (2-8-8-8-2 and 2-8-8-8-4) and the Virginian's even more impressive 2-10-10-2s. Overall, however, in the late teens they were not as popular for heavy tonnage on steep grades as nonarticulated power, either 2-10-0s or 2-10-2s or doubleheaders. The disparity is evident from the number of articulateds relative to 2-10-2s ordered by American railroads in 1916: 315 2-10-2s vs. about 200 Mallets of various wheel arrangements. Since driving wheels on Mallets seldom exceeded a rather diminutive 57 inches, most roads apparently regarded them as satisfactory for pushers but not for power over the road. Further attesting to a relative lack of demand for Mallets is that of all the USRA locomotives built solely for freight service, the 2-6-6-2 and 2-8-8-2 were the least popular wheel arrangements. Yet because of their advantages to the coal-hauling Pocahontas roads, the 2-6-6-2 and 2-8-8-2 as wheel

4-6-2, LIGHT Atlantic Coast Line No. 1523, a light 4-6-2. Only 81 USRA light Pacific were built, but many copies were built in later years. Classic Trains collection



4-6-2, HEAVY All 20 USRA heavy 4-6-2s went to the Erie. They shared the boiler of the light Mikado and the firebox of the heavy Mikado. Alco

A Wheeling & Lake Erie I-3 class 2-6-6-2 works train 170 south to Brewster at Canton, Ohio, in March 1936. The railroad had 10 such locomotives, built by Baldwin in 1919 and retired 1941-1955. C. W. Burns

N&W had 227 of the 2-8-8-2 Mallet, more than any other carrier, and built them until 1952. No. 2023, pictured at Bluefield, W.Va., in 1958, is a class Y3, one of 50 built for N&W under USRA auspices in 1919. Robert A. Caflisch, Helen Caflisch collection

arrangements remained in service to the very end of U.S. steam operations.

The probable source for the design of the USRA light Mallet is the 2-6-6-2 first introduced by C&O in 1910 and improved upon in 1911. Among the first equipped with a superheater, it was the first with an extension of the firebox serving as a combustion chamber, a feature that permitted lengthening the boiler (through keeping lengths of tubes down) so that the firebox could sit completely in back of and below the driving wheels. So well did the 1911 order perform that the Norfolk & Western borrowed a C&O 2-6-6-2 to compare with its best Mallet — the Y1 2-8-8-2. An N&W employee familiar with the tests reportedly said the "C&O engine literally ran circles around the Y1."

By 1918 this 2-6-6-2 design had proved itself so well that it was logical for the USRA Builders' Committee to conform its 2-6-6-2 to essentially the same principal dimensions. The question naturally arises that if the USRA 2-6-6-2 was based on so successful a design, why did it end up being somewhat of a pariah on the only two roads getting it: C&O and Wheeling & Lake Erie? Mainly because design was not well matched with service, as evidenced from perusing "Comments and Criticisms" of 1920 in which railroads' complaints are answered by the government, if called for.

In that booklet, the W&LE compared its light USRA Mallets with the 2-6-6-2s it had received in early 1917, which as Mallets were notable for having 63-inch drivers. W&LE believed the 57-inch diameter drivers on the government engines were "too small for terminal-to-terminal service." From this statement one can hypothesize that W&LE found the government 2-6-6-2s unsuitable for mainline service and confined them, as much as possible, to mine-shifter and branchline work. W&LE's further complaint that the wheelbase of the standard locomotives was "too long for local conditions" fits this supposition. In response, the USRA conceded that the design did not meet W&LE "conditions." As for the wheelbase difficulty, USRA reported that it was "overcome by changing tenders with the Mikados." (W&LE had also received 20 heavy 2-8-2s from USRA.)

It appears, then, that the Wheeling did not know how best to use its USRA 2-6-6-2s. Too slow for road service, they were too numerous for solely mine-run work, even though most apparently went into that service. Despite having drivers 6 inches lower, the USRA Mallets lasted longer than W&LE's 2-6-6-2s of 1917. The high-drivered 2-6-6-2s were all scrapped in 1939 after W&LE started receiving 2-8-4s. Six of the USRA engines were scrapped in the early 1940s, with four retained beyond the Nickel Plate merger of 1949. The U.S. Mallets outlasted the road's own 2-6-6-2s because the former were a more advanced design. Lack of a combustion chamber forced the firebox to ride over the last driver, considerably lowering the steaming potential of the W&LE 2-6-6-2s. The Wheeling did not consider the USRA Mallets a bad design; it was just that a use for them could not be found commensurate with their specifications. A further indication that the W&LE did not particularly want the standardized 2-6-6-2s to begin with is that they were originally ordered for the Chicago & Western Indiana, a terminal railroad allied with the Belt Railway of Chicago, and then diverted to the W&LE.

So it was with the Chesapeake & Ohio, which did want Mallets, but it wanted bigger and better power than its own 2-6-6-2s for service over its mountainous main line. The mismatching of design to service can be inferred from the history of the road's Mallet development and from a somewhat ambiguous evaluation of them in "Comments and Criticisms." In its comments to the USRA, C&O emphasized that its own class H-4 2-6-6-2 had developed higher steam tempera-

4-8-2, LIGHT **New York, New Haven & Hartford No. 3300, one of 47 built, was a USRA light 4-8-2. The design would prove popular after USRA control ended.** Alco

4-8-2, HEAVY **Only 15 were built, including Chesapeake & Ohio 133, under USRA control; another 37 copies were built through 1926.** Alco

Atlantic Coast Line 4-6-2 1524 speeds the *Dixie Flagler* toward Atlanta, Ga., in the 1940s. ACL obtained 70 USRA light Pacifics in 1919-20, built by Alco's Brooks and Richmond works. These stuck out on the roster as the road was typically a loyal Baldwin customer. ACL later went to Baldwin for more 4-6-2s. L. A. McClean

ture than the government's 2-6-6-2. Most roads responding to the USRA questionnaire had not had their standardized locomotives long enough for formal testing. One of the few able to cite figures was C&O, which found that the USRA 2-6-6-2s developed 15 degrees to 20 degrees less superheat than the road's own H-4, "… there being no marked difference otherwise in the performance."

What particular effect the difference in temperature had on performance the C&O respondent does not say. He does admit the USRA Mallets "steamed well and performed satisfactorily." As for construction and design, the USRA found that the majority of C&O's complaints about its 2-6-6-2s (e.g., need to reduce steam pressure from 225 to 210 psi, ashpans of poor design, lack of convenience and comfort in cab arrangement) were related to C&O's preference for its own designs and standards and "are not based upon failures due to design, construction, or operation," in the words of the USRA.

The main reason for C&O's rather two-faced response to these locomotives is that it did not know what to do with them despite the fact that their design was based closely on its own proven H-4. By 1918, C&O wanted bigger power than 2-6-6-2s. It knew that rival N&W was getting huge 2-8-8-2s and the parallel Virginian Railway even bigger 2-10-10-2s. C&O by 1918 was adapting some of its big fleet of 2-6-6-2s to mine-run service. It would not want more 2-6-6-2s for mainline work. USRA 2-8-8-2s would have constituted an advancement; 2-6-6-2s would not. But because of their 15-foot 9-inch vertical clearance, C&O could not use the 2-8-8-2s — C&O's clearances east of Huntington, W.Va., were just 15 feet. The government 2-6-6-2s would meet the clearance, which would not be increased until the 1930s. In the meantime, C&O did design a 2-8-8-2 that would meet the 15-foot limit — the H-7 2-8-8-2 simple articulated of 1924.

C&O never found a place as a "mountain mauler" for the USRA 2-6-6-2s. They were scrapped in 1951-52, before C&O cut up its numerous remaining 2-6-6-2s, built to its own original design. But C&O's own 2-6-6-2s had had no pretensions to mainline service. In fact, the 2-6-6-2s it purchased from Baldwin in 1949 were intended solely for mine-run service and were so used until their scrapping at the end of steam in late 1956. The USRA Mallet displeased C&O as a mine-run locomotive a much as it did as a mainline locomotive.

A SOLID LEGACY

This is not the place to examine closely the real "winners" among the USRA designs — the 0-8-0 switcher and the 2-8-8-2 heavy Mallet. Numerous accounts have appeared of how the USRA 2-8-8-2, through alterations and refinements, evolved into the N&W Y6b, the ultimate compound articulated. Equally notable was how the heavy switcher (0-8-0), again through refinements like more weight, an increase in driver diameter, front-end throttles, cast-steel engine beds, and over-fire jets, lasted in large quantities to the very end of steam. A solid design that never aroused controversy, the USRA 0-8-0, as refined on the C&O, became the staple switcher of the N&W and the Virginian, lasting on the former until the end of steam in 1960.

The popularity of the USRA Pacifics, Mountains, and Mikados is readily verified by the numerous orders for them after dissolution of the USRA, even from roads that had

2-6-6-2 C&O 875 is a USRA 2-6-6-2. The design was unwanted by C&O, which would have preferred 2-8-8-2s built for its lower clearances. Classic Trains collection

2-8-8-2 Virginian 900 was soon relettered and transferred to Norfolk & Western as its No. 2000. There were 106 built under USRA control. Alco

been allotted no government locomotives originally. And even though, as designs, these locomotives lost out in the Super Power revolution of the 1920s to, respectively, Hudsons, Northerns, and Berkshires, the fact that USRA designs (especially the light and heavy 2-8-2s) persisted until the end of steam is sure evidence of the soundness of the designs. Even as late as 1944 the Atlanta & West Point/Western of Alabama ordered from Baldwin two heavy Mikados identical in major dimensions to the USRA heavy Mike, but refined with appliances and construction techniques that 26 years of steam locomotive development had permitted to be applied.

Responses from motive power officials queried in "Comments and Criticisms" and investigations of locomotive historians yield reliable data on the need and performance of the various USRA types. Much harder to assess is whether the government got its money's worth with its orders for new domestic locomotives. "Profiteering" did occur, of course, for since wartime increases demand, prices naturally rise as a result. But without knowing annual increases in the wholesale price index, or fluctuations in the price of steel 1916 to 1919, it is difficult to determine whether defense contractors — in this case the locomotive builders and their suppliers — were making excessive profits.

Cost comparisons in the years 1917, '18, and '19 can hint at what was going on. John Rehor's *The Nickel Plate Story* (Kalmbach, 1965) includes the unit cost of the USRA 2-6-6-2 of 1919 and the W&LE 2-6-6-2 of 1917; the former weighed (locomotive only) 452,000 lbs. and cost $71,967; the latter weighed 435,000 lbs. and cost $53,427. With the ratio of weight to cost being roughly the same for both models, one concludes no great increase in unit cost occurred from 1917 to the August 1919 date of delivery of the first of the USRAs. Rehor's figure for the USRA is, however, $6,300 less than the cost given in William D. Edson's "The USRA Locomotives" (Railway & Locomotive Historical Society *Bulletin* No. 93), thus precise conclusions are difficult to draw. Edson's figures for all 12 types do show increases of up to $7,200 for the same type between 1918 and '19. Overall, the figures do suggest that the locomotives were selling about the same price in 1918-19 as they would if there had been no USRA.

The government also appeared to get a quality product for its money. One way it controlled quality was through careful selection of accessories or "specialties." First, the Railroad Committee selected the specialties — based on their contributing to "efficiency and economy" — and set the specifications. The process of selection involved secret meetings, which specialty salesmen were forbidden to attend. Naturally they resented, as Railway Review reported, being forbidden from plugging their wares: "The railway supply men at Washington are very bitter … at the secret sessions of the mechanical committee, in which devices were given 'thumbs down' without a chance for the maker to be heard as to why his device should be accepted or not. It is claimed that the mechanical committee before going into session took an oath of secrecy and that no opportunity of any kind was given the supply men to … defend their product."

Glorious in green and gold, Southern No. 1477 makes classy work of lowly Knoxville-Bristol local No. 4 at Mohawk, Tenn., on May 27, 1952. Southern's Ts-1 class 4-8-2s came from Baldwin (15) and Richmond (10). The end of steam on the Knoxville Division was less than a year away in January 1953. Edward Theisinger

Next, the Purchasing Committee handled the actual purchases. With each supplier, the committee conferred on "contract, ability to deliver promptly, and the lowest net price."

The Purchasing Committee did its job well. Most specialties came from reliable firms that were still in business at the end of steam construction in the late 1940s. Usually, except for accessories that could be supplied by only one manufacturer, orders were distributed among competing suppliers. Ragonnet (Franklin Railway Supply Co.) was by far the most common reverse gear, but the Lewis (Commonwealth), Mellin (American Locomotive Co.), and Brown (Southern) were also used. The valve gear itself, which the reverse gear operated, was supplied in proportions one would expect from their later applications: 500 Walschaerts, 840 Baker, and 185 Southern (the latter only for the light and heavy 2-10-2 types). Attesting to the high standards of the USRA specifications is that the Pilliod Company, maker of the Baker valve gear, announced in a press release that it was improving construction of the gear in compliance "with the requirements of the United States Government standard locomotives."

If the overall controversy about the cost and need of the USRA can never be stilled, in at least one area enough data is available to draw valid conclusions: Locomotive standardization worked despite over-zealousness in multiplying the types constructed to include two wheel arrangements not needed. Further, no evidence of wrongdoing exists from those involved in the program and profiting from it, while evidence does exist of engineering competence and committed workmanship, which locomotive authority Alfred W. Bruce lamented was not perpetuated: "Soon after the properties were returned to the railroads in 1920 … the whole structure of standardization began to fall apart, and in a short time it was no more than a memory. It is unfortunate that the Engineering Committee did not continue to function in the common interest of all concerned, for standardization of types was certainly a great step forward." ■

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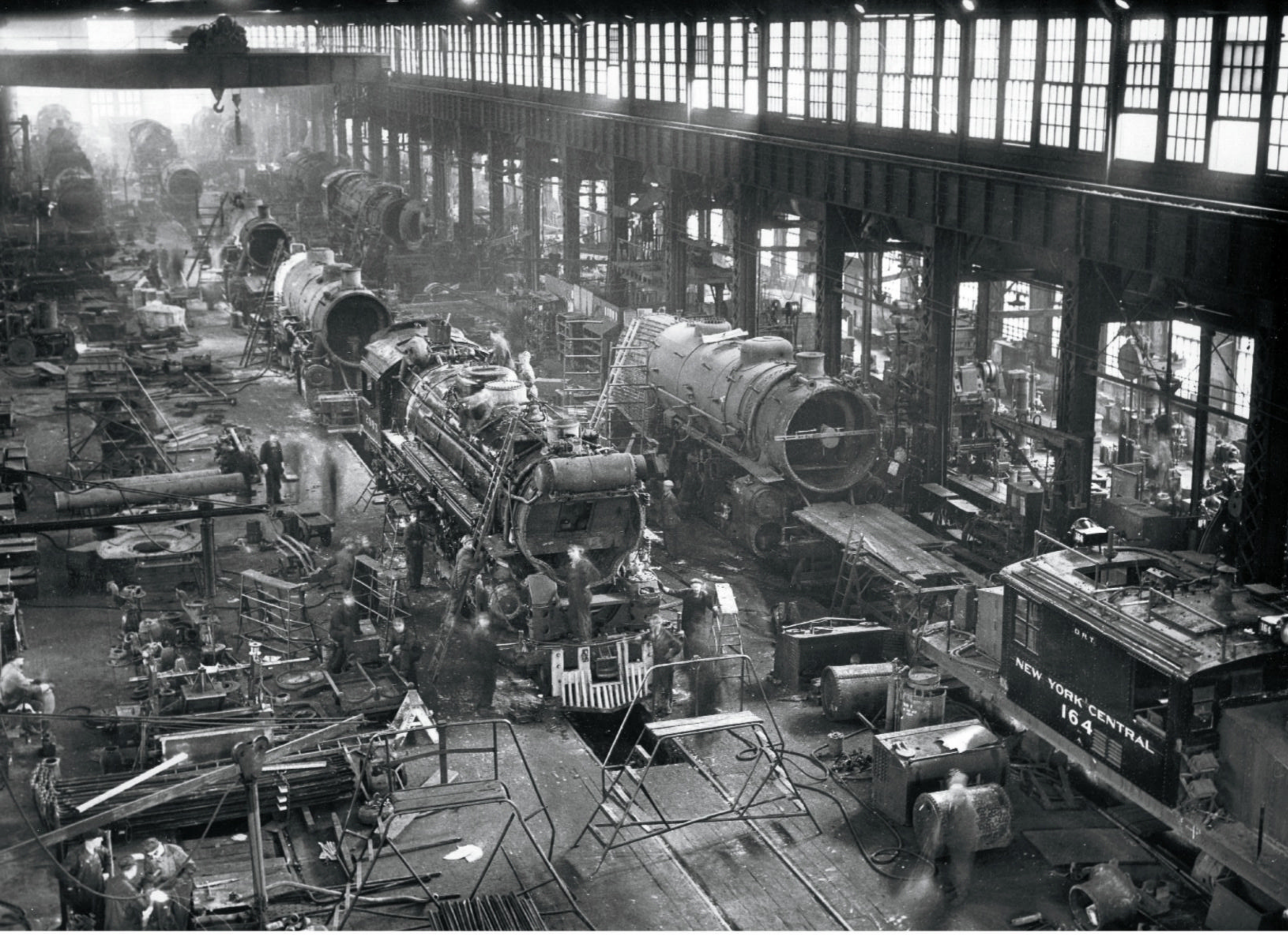
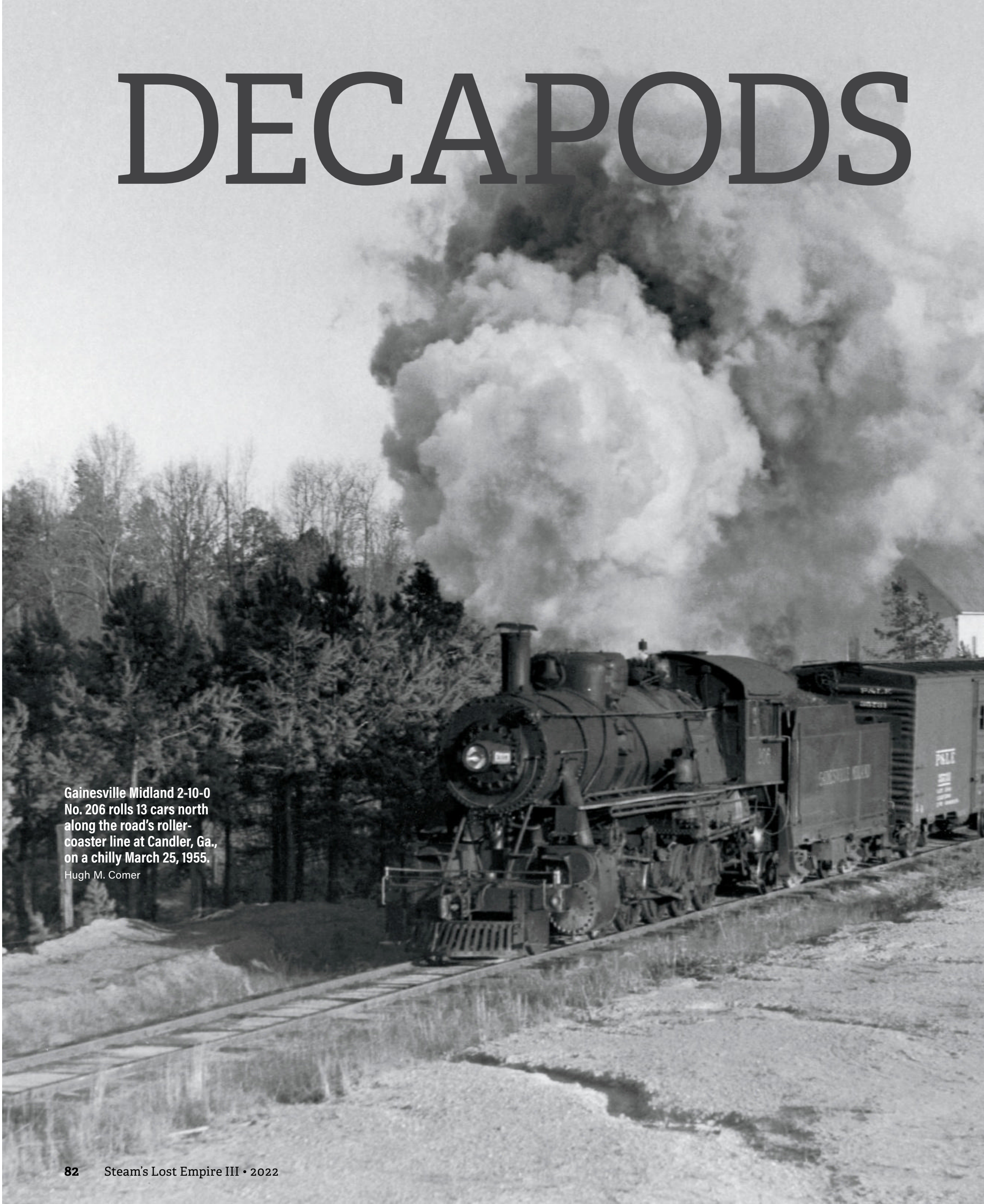
NICKEL PLATE ROAD **A March 1957 view of the Nickel Plate's shop at Conneaut, Ohio reveals a sight that had become rare by this late date in the steam era: four big 2-8-4s under overhaul. Eight years earlier, as other roads were moving toward full dieselization, NKP was still taking delivery of new Berkshires for high-speed freight service. As of the date of this photo, the road is buying diesels fast, and Conneaut is its last steam shop. NKP's 2-8-4 fleet fell silent in mid-1958. A few 0-8-0s were reactivated briefly in 1959.** Jim Shaughnessy, Center for Railroad Art & Photography collection



NEW YORK CENTRAL More than a dozen locomotives crowd New York Central's back shop at Jackson, Mich. in the early 1940s. World War II has choked the railroads with traffic and the workers are doing their best to get engines back on the road as fast as possible. There's nary a diesel in sight, but the scene isn't quite 100% steam, either. A steeple-cab motor from NYC's Detroit River Tunnel third-rail electric operation, 74 miles east along the old Michigan Central main line, is also in for overhaul. New York Central

DECAPODS



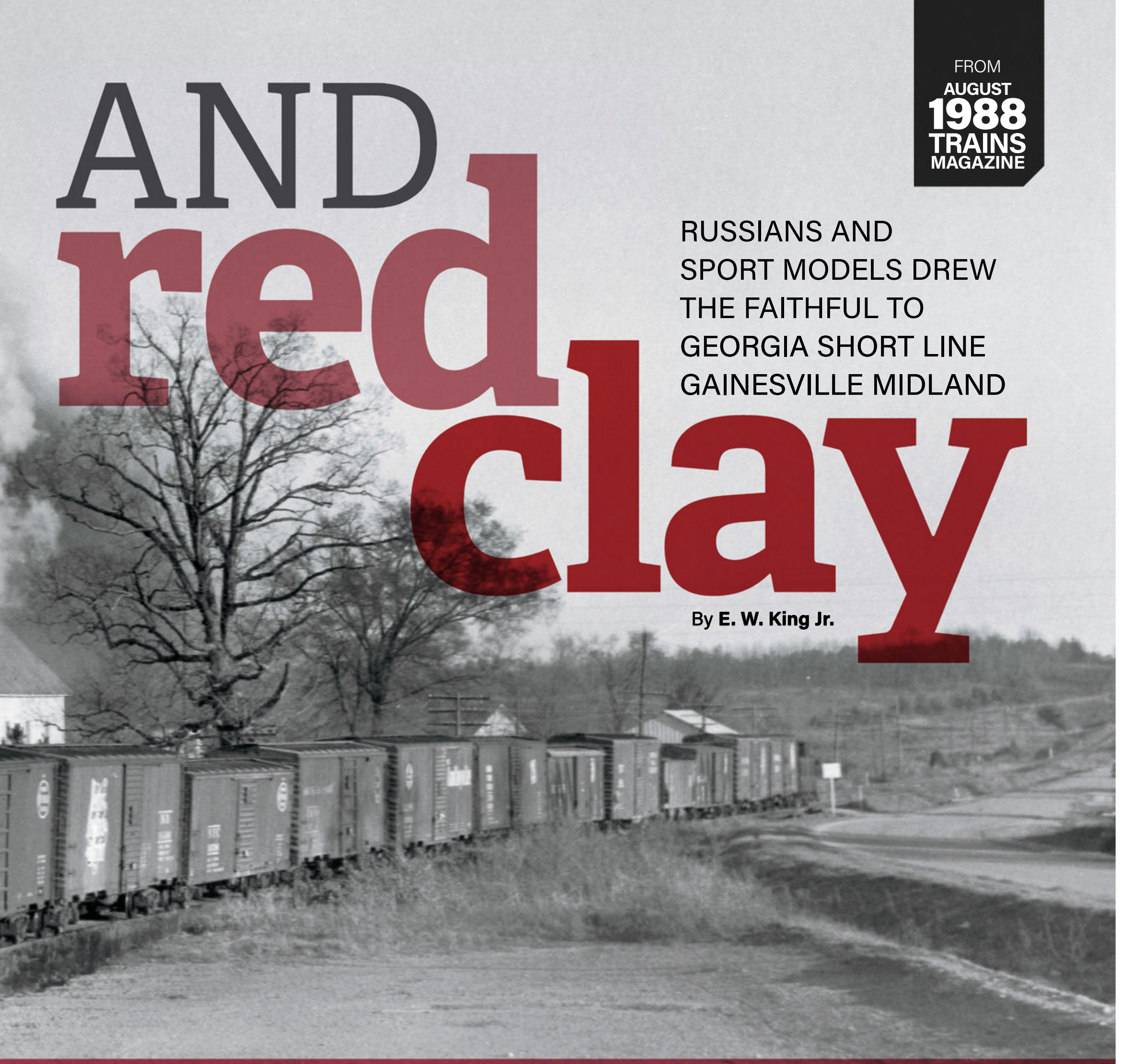
Gainesville Midland 2-10-0 No. 206 rolls 13 cars north along the road's roller-coaster line at Candler, Ga., on a chilly March 25, 1955.
Hugh M. Comer

FROM
AUGUST
1988
TRAINS
MAGAZINE

AND red clay

RUSSIANS AND SPORT MODELS DREW THE FAITHFUL TO GEORGIA SHORT LINE GAINESVILLE MIDLAND

By **E. W. King Jr.**



“Just think how much easier the Lord could have created this earth if He’d had bulldozers.”

Such a quote comes to mind when considering the Gainesville Midland Railroad, a 40-mile line in north central Georgia. If He’d had bulldozers, the Gainesville Midland might not have been nearly as interesting a railroad as it was. Its profile could have been almost flat. But the way things turned out, an awful lot of the GM’s track was laid virtually right on top of the ground.

Decapod 207's fireman enjoys a cigar as his locomotive barrels down GM's lightly built track in April 1957. Philip R. Hastings

Workers top off Decapod 206's tender at the rudimentary coaling facility at Belmont — the only one on the 40-mile GM — in 1956. David W. Salter

Five were of the World War I "Russian" design, referring to the 525 built during 1915–17 for Russia's 5-foot-gauge railways.

GM's shop at Gainesville was as charming as it was cluttered. Engines visible are (from left) 2-10-0 206, 2-8-0 116, and 2-10-0 208. P. R. Hastings

During the late 1950s, the GM was Georgia's last steam-locomotive bastion, and so became a magnet for train-watchers and photographers. Meandering southward from Gainesville to a connection with the Seaboard Air Line at Fowler Junction, the short line encountered grades as steep as 3%. From Fowler Junction into Athens, GM operated on 2 miles of SAL trackage rights. The challenging terrain meant that the Moguls, Ten-Wheelers, and Consolidations typical of short lines just wouldn't do. Decapods were the answer.

Before the short line was sold to Seaboard in 1959, the GM was partially owned by Atlanta's Georgia Car & Locomotive Co., a circumstance which ensured the GM a supply of pre-worn engines. The only new steam locomotive ever to appear on the GM's all-time roster of 31 engines was a trim little Baldwin 4-6-0 the road obtained in 1906. The GM had a 4-4-0 from the Georgia Road; a Ten-Wheeler from the Western Railway of Alabama: a Mogul from the Georgia: 4-8-0s from the Buffalo, Rochester & Pittsburgh; Consolidations from the Buffalo & Susquehanna, Central of Georgia, and Charlotte Harbor & Northern; and Decapods from four roads.

Ah yes, the Decapods. Gainesville Midland owned nine of them over the years. Five were of the World War I "Russian" design, referring to the 525 built during 1915–17 for Russia's 5-foot-gauge railways. The Russian Revolution interfered, and about 100 of them could not be delivered; these were converted to standard gauge, distributed to American railroads, and employed to help alleviate World War I motive-power shortages. They boasted 52-inch drivers and were the most powerful engines the GM ever owned; the quintet had come from Gulf, Mobile & Ohio; Alabama, Tennessee & Northern; Seaboard; and Macon, Dublin & Savannah.

The other four GM Decapods had a less exotic lineage. In the mid-1920s, Baldwin Locomotive Works had come up with two 2-10-0 designs intended for use in low-axle-loading territory. The light Decapod had 25 x 30-inch cylinders and 57-inch drivers, weighed about 255,000 pounds, and produced a tractive force of about 60,000 pounds. Examples include GM&O's 200 series and Nos. 801–805 on the Kansas City, Mexico & Orient, the latter of which became Santa Fe 2565–2569 when AT&SF acquired the Orient in 1928.

A lighter Decapod design found even wider acceptance. Developing tractive efforts in the 46,000–49,000-pound range, depending on boiler pressure setting, these engines had 24 x 28-inch cylinders and 56-inch drivers, and weighed only 212,000 pounds. They were used by such diverse carriers as the Osage Railway; AT&N; Georgia, Florida & Alabama (later Seaboard Air Line); and Seaboard itself. They were very satisfactory in fast freight service on lines with extreme weight restrictions. Engines of these same general specifications also were built by the Canadian Locomotive Co. for the Edmonton, Dunvegan & British Columbia, later part of Northern Alberta Railways.

Four of the lighter 2-10-0s found their way to the Gainesville Midland from the AT&N and Seaboard. On the GM, the high-mounted engines were affectionately called "sport models."

During a water stop at Pendergrass, fireman Arnold Hutchins oils around as engineer B. L. Byrd stands in the gangway of No. 207. Philip R. Hastings

Having picked up cars at the Seaboard interchange in Athens, No. 207 heads back north to Gainesville near Fowler Junction. Philip R. Hastings

GM's two "classy" ex-Lackawanna cabooses stand outside the shop buildings at Gainesville in April 1957. Philip R. Hastings

The eccentric rods had been heated and stretched and shortened so many times they looked like snakes.

In early September 1959, Russian Decapod No. 206 and Baldwin "sport model" 203 team up on what turned out to be the last regular-service steam doubleheader in Georgia. C. J. Dismukes

The GM's track was light, but not too badly maintained. Use of 65- and 75-lb. rail was standard, and the ballast was mostly gravel. As a result, the 2-10-0s were ideal locomotives — they had the power of good medium-size 2-8-0s, but with the weight spread over five driving axles.

The GM operated in a Class I mainline manner — no backing up for miles to the nearest wye, for instance. And the road had cabooses — it had obtained two classy jobs from the Lackawanna. Hence, a Gainesville Midland train looked like a Class I train ought to look, with one of those good-riding hacks on the rear end.

By the time the mid-1950s rolled around, only seven engines remained of the all-time 31. Ex-Central of Georgia 2-8-0 116 (Baldwin, 1907) was out of service. The 301, a 1920 Baldwin 2-8-0 which came from the CH&N via the Seaboard, worked the yard at Gainesville.

Only one of the Russian Decapods was left — the 206. Originally assigned USA No. 1088 as an export item, she had toiled for Detroit, Toledo & Ironton, SAL, and MD&S. Sport model Decapod 203 (ex-AT&N), 207 (ex-SAL, originally Georgia, Florida & Alabama), 208, and 209 (both ex-Seaboard) remained on the roster; the 207 had turned over in 1954 and saw little service after being repaired.

Locomotive maintenance seemed to be inconsistent. There was always slack between engines and tenders, and spring riggings needed leveling; neither of these conditions helped the ride. Once, engineer Jewell Ivey noticed a broken back driver spring while inspecting 203 during a water stop.

"Where'd it happen, Jewell?"

"I don't know. The engine rides so damn rough anyway, I couldn't tell the difference."

But the GM had a good valve-setter working in that little shop at Gainesville — those little Decapods hit on all four corners, and they spoke with authority. The eccentric rods had been heated and stretched and shortened so many times they looked like snakes.

The GM's only coal and sanding facility was at Belmont, 10 miles out of Gainesville; the 301 had to run out there every day or so for supplies. GM engines sported screen spark arresters on their stacks, and the usual fuel looked like a good grade of black dirt — indeed, sometimes the coal sprouted weeds.

All the Decapods were equipped with Standard stokers. The 203, however, had derailed her tender on one trip and torn up her screw and conveyor. It was never repaired, so she had to be hand-fired.

A daily round trip local took care of GM's business Monday through Saturday, but Sunday was another story. No local was run, but in the late afternoon a doubleheader would leave Gainesville and run to Athens; the Sunday night pickup from the Seaboard was usually very heavy, and GM's steepest grades were against northbound traffic.

The northbound twosome put on Gainesville Midland's most impressive performance. After climbing out of the hole at Fowler Junction and taking water at Oconee Heights, the 2-10-0s would be off with their 40- to 45-car drag, topping the rises at 25 or so and hitting up to 50 — yes, 50 mph — in the little dips. From the Oconee River crossing north of Jefferson up to Belmont was a different matter, though. It was all uphill, and the last couple or three miles was 3%. The toughest stretch would be doubled, with the cut made on the fly.

The doubleheader was most interesting when 206, the Russian, was used as the second engine. With its 52-inch drivers, it would make about nine exhausts while the sport model up ahead was making eight. Roaring up through Talmo at a wide-open 15 mph provided a treat for the ears. A treat for the eyes was 206's firebox; unsheathed, it was equipped with hollow staybolts, and when viewed from the proper angle, every staybolt showed a pinpoint of flame.

Watching this spectacle as the 1950s came to a close was like using a time machine — it was the 1930s all over again. One expected the GM train to be held at the Southern Railway crossing at Gainesville for a Ps-4 on a passenger train to pass, or perhaps a peach train pulled by an Elesco-heavy Mike. Sorry, but when such occurred, it was F-unit diesels on the Southern.

But reality set in during late 1959. Seaboard bought the GM, and replaced 301 and the Decapods with Alco RSCs. Happily, six GM steamers — two 2-8-0s and four Decapods — were saved and survive today.

Gainesville Midland's unusual power, hospitable people, and modus operandi of a Class I main line made it a railfan's delight during those last halcyon years of steam. U.S. Highway 129, which paralleled the GN main for most of the 40 miles, at times seemed to be paved with yellow Kodak film boxes. And the GM's appeal was not diminished by the fact that God didn't have any bulldozers. ■

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PENNSYLVANIA It's a busy June 20, 1951, just west of the PRR's station at Altoona, Pa. A track crew is busy on the right while an eastbound freight passes in the middle of the photo. At left, J1 2-10-4 No. 6440 is helping T1 4-4-4-4 No. 5549 on a 27-car westbound mail-and-express train. The locomotives, eight and five years old, respectively, are combining their nearly 160,000 pounds of tractive effort for the 12-mile climb to Gallitzin, summit of the railroad's four-track main line over the Alleghenies. Edward Theisinger

BALTIMORE & OHIO Fireman and head brakeman look ahead from B&O 7600 as their train labors up Sand Patch Grade a few miles west of Hyndman, Pa., on June 28, 1956. The locomotive is the first of the road's 30 EM-1 2-8-8-4s built by Baldwin in 1944–45. The class was B&O's biggest and last all-new steam locomotives. But for wartime restrictions, they might not have been built: B&O wanted more than the three A-B-B-A sets of FT diesels it received in 1942 but the War Production Board did not approve them, so the road turned to Baldwin for a new steam design. Bill Price

FROM
SEPTEMBER 1973 TRAINS MAGAZINE

AN EX-FLYBOY GOES RAILROADING IN THE

BLUE MOUNTAINS

By **James E. Satterfield**

"Hit the injector, you idiot!"

The fireman of Union Pacific 2-8-8-0 No. 3567 eyes the camera as his engine works a freight between La Grande and Pendleton, Ore. Engines like this were typical freight power when author Satterfield was firing on this territory. Union Pacific

Led by 2-8-8-0 No. 3521, scheduled freight 160 holds the main for a meet with another train at Perry, Ore., in August 1944. Union Switch & Signal

Sometimes I wonder how the old Oregon Trail pioneers felt as they approached the Blue Mountains of Oregon. Perhaps it was with dull resignation of another mountain range to cross after months on the trail. At this stage of their journey, little doubt could have existed that their mules and oxen were exhausted and their supplies were at the vanishing point. Their last rest and supply point probably had been Fort Hall, some 400 miles behind them in Idaho. Perhaps they were elated at merely being in Oregon, knowing they had little farther to go on their long journey. In any event, the task ahead of them was formidable; and as they camped on the flatland near the present city of La Grande, they must have pondered how to conquer the narrow gorge of the Grande Ronde River, through which lay their route over the mountains.

Little did these hardy pioneers know that in the not-too-distant future the surveyors of the Oregon Short Line would be pondering many of the same questions in an effort to build a railroad over the mountains to connect with the Oregon Railway & Navigation Co. line at Pendleton. In this historical setting did I first have direct access to the mysteries of steam railroading, mountain style. The experience was enlightening.

My job with the Union Pacific, successor to the OSL and OR&N, was not planned. My intent was to fly airliners. Had it not been for the blandishments of an attractive redhead, the interlude might not have happened at all. In late October 1945, I, along with some 2,000 other members of the Army Air Corps, was sweating it out at Walla Walla Air Base in Washington. The war was over and we wanted out. The Army bureaucracy was overwhelmed with requests for discharges. A point quota system had been set up based on length of service, time overseas, and other criteria, and as a result I was among the first to be released.

My initial act was to race to Seattle to apply for an airline job. I was told I would be accepted and would be notified when, and if, my services were required. Satisfied with this tentative acceptance, I mounted my 1941 Mercury coupe and started homeward to visit my parents in West Virginia. The following day, I found myself in La Grande, Ore., a railroad town with a couple of hotels and a main street hosting a few watering holes with name like "Railroad Inn" or "Switchman's Shanty." Tired from my drive, I took a room at the local hostelry. After ablutions and a sandwich, I wandered down to the Union Pacific depot for a look at the trains. The first order of business was to read the trainboard. I found that No. 17, the *Portland Rose*, was due in about 10 minutes, or 20 minutes, per the message in chalk which read "10 minutes late."

As I wandered down the platform, I noted the extensive yards and the backshop. This evidently was a place where considerable rail activity occurred. My thoughts were interrupted by the sound of an engine coming fast, whistling for the yard. Five minutes later a giant

"That ain't just any engine; that's a Challenger."

Union Pacific Challenger 3938 leaves Boise, Idaho, with the 18-car *Pacific Limited* on Nov. 4, 1945, about the time sister 3939 introduced Satterfield to the 4-6-6-4 type at La Grande. Henry R. Griffiths Jr.

UP IN EASTERN OREGON

of a locomotive, wearing the number 3939 and pulling 15 heavyweight head-end and passenger cars, drifted to a halt in front of the depot. It had no more than stopped when dozens of figures — or so it seemed — leaped from the shadows and placed blue lights and flags up and down the train. I looked again at the engine, whose blower sound was loud in the evening air. I could not recall seeing so huge an engine on a passenger train.

I spotted a railroad man and inquired why what seemed to be a freight engine was pulling a passenger train. He advised me in short order: "That ain't just any engine; that's a Challenger."

I didn't know exactly what a Challenger, or 4-6-6-4 type, was. The engine was a simple articulated like those that pulled coal in West Virginia. True, the drivers seemed a little larger and the train would be a heavy load for a more conventional passenger engine. Sensing my puzzlement, my friend of short acquaintance allowed that this machine was a dual-purpose engine, but on this division it was used only to haul heavy passenger trains. The 3939 was put on at Huntington and it would run all the way to Rieth (wherever that was). He told me it could keep those 15 heavyweight cars on schedule without a helper from the east to La Grande, and that was why it was used as a passenger engine. From La Grande west to the top of the hill at Meacham, it would need help. In confirmation of his statements, a few moments later a big-barreled Mikado eased through the crossover, and attached itself to the front of the train. One by one the blue markers came down, and the conductor herded 8 or 10 passengers aboard. The blowers on the two engines were wide open when the highball came and they leapt into action.

As the markers passed me on the platform, the shrieking of the blowers had become a deep-throated roar as though both engines' reverse levers were full forward. In the space of 200 yards the train appeared to be racing toward the mountains. "Do they often leave town like that?" I asked my newfound friend.

"They have to," came the reply. My friend noted that to the west were about 2 miles of level track to where the grade started. A fast departure was in order if a train was to best the 11 miles of 2.2 percent grade to the top of the Blue Mountains. I was pleased at having witnessed such a sight, and I departed the station with the thought of sleep and an early-morning resumption of my drive east. Such was not to be the case.

NIGHTCAP AT AN OASIS

As I wandered the block from the depot to the hotel, I noted an oasis of sorts across the street. Perhaps a nightcap would be a good idea. I entered a darkened room which had a long mahogany bar complete with mirror and pseudo gaslights. To the left were booths in which couples nuzzled contentedly. To the chagrin of my teetotaling fundamentalist parents, I had developed the habit during the war of tasting the grape upon occasion, and this seemed an appropriate place.

While I was enjoying the comforts of the oasis, who should walk through the door but two recent compatriots from the Air Force. They were still in service at Walla Walla Army Air Base 120 miles away, and in their weekend meanderings they had found La Grande. I deduced from their conversation that they did not care how long their discharges were delayed as long as they could come to La Grande on weekends. This news raised doubts in my mind as to their sanity, since the classification of La Grande as a swinging place was not justified from what I had seen thus far. I was wrong.

La Grande, I was to learn, was an unusual town. My buddies relayed the facts that, first, an all-girl school was located here; second, half the male population was still in service; and third, most of the remaining men were railroaders working 16 hours a day. As a consequence there were five girls for every eligible male. In addition, except for Walla Walla, no Army or Navy bases were close. When my friends suggested they might be able to find me some interesting companionship, the thought of sleep faded from my mind. Their offer, and the night's subsequent events, were to have a profound influence on my becoming a railroader.

The evening was a huge success. Release from the Air Corps after 4½ years, plus the company of that attractive redhead, had its effect. At

Three miles out of La Grande, 2-8-8-0 No. 3532 makes 25 mph with a 70-car westbound extra in July 1948. The heavy grade starts at Hilgard, about 4½ miles ahead. Henry R. Griffiths Jr.

Satterfield's eastern terminal was Huntington, Ore. Four years after he moved on from UP, train 25 pauses there — still steam powered. W. V. Anderson

a local melting pot south of La Grande, we kept the jukebox warm with a never-ending supply of nickels. My lovely turned out to be the daughter of a railroader, and during one of our many dances that night she whispered that it might be possible for me to make as much as $1,000 a month on the extra board. The experience was heady for a boy from the hills whose knowledge of girls was severely limited. I reasoned that while I was waiting for my airline job I might as well make money in a place where my talents were appreciated by the important elements of the community.

The alacrity with which I was accepted as a student fireman surprised me. I filled out an application, received a timetable and a book of rules, and was told to get a railroad watch. The acquisition of a railroad watch in 1945 was difficult. However lucrative the trade was for the one local horologist, he could not provide a new watch or even one of moderate vintage. I was told it would take six months or longer to acquire a new Hamilton, but if I would take a used watch, he would place my order.

From under the counter he brought forth something resembling a large cigar box in which rested the most outlandish collection of timepieces this side of the Smithsonian Institution. I was assured that all had been repaired and serviced and were guaranteed to be as accurate as the Naval Observatory. From the box he selected one with an ornate elk etched on the front cover and a gargoyle-like steam locomotive on the back. The back opened to an inscription which read, *To Charles from Harriet, Christmas, 1912*. The timepiece had huge Roman numerals and was as big as an orange. It must have weighed at least a half pound.

After paying $35 — which I was assured would be applied to a new watch if one ever came in — for the used watch, I learned that if one has a railroad watch one must have a chain to carry the watch. Nothing less than a 24-carat gold chain would do. Another $10 took care of the chain. After paying two weeks in advance for my room at the hotel, plus my expenditures on the redhead, I realized the wisdom of my working for the Union Pacific as quickly as possible. After writing a brief note to the airline to inform them of my whereabouts and a postcard to my parents, I set about learning railroading firsthand.

STUDENT TRIPS

The UP was a generous railroad — or perhaps it just needed help desperately — for it paid you while you were cubbing the road. It was necessary to learn from one end to the other that part of the road on which you were to work. This meant going both east and west out of La Grande. Our territory extended west over the Blue Mountains to Rieth, just west of Pendleton. To the east the territory ended at Huntington. My first trip was La Grande-Huntington. Although it appeared to me that we were heading south, I was informed we were eastbound. As an aviator I always had assumed that the way to go east was to point oneself toward the rising run or until the compass read east. I knew UP trains usually wound up in Omaha, which was to the east; so as the fireman said, we must be going east.

My first trip was spent riding and observing. I deadheaded back to La Grande, and the next day I went west on a time freight to Rieth. For a week this procedure went on as the firemen tried to explain to me the intricacies of firing a 3500-class 2-8-8-0. First you hosed down the cab to make it clean. Next you checked for leaks in the tank. Then you went back to the cab to check the oil-measuring stick on the front of the tank to see if the hostler had filled her up. Next you made sure your sand scoop was handy and that you had sand in a small box behind the fireman's seat. Next you ascertained that the atomizer in the firebox was operating properly. Then came the injector and the feedwater pump. Then the blower, the engine generator, and the running lights.

Finally, after checking water levels, you climbed up the front of the engine to put up the flags and the markers. Most of the time these

flags were white and the train bore the number of the engine preceded by an X, denoting an extra. After you climbed out on the running boards and checked the sand domes and the lines, the preliminaries were over and you were ready to go.

At first, firing one of these monsters did not seem difficult, but soon I was to learn that each engine had an individual temperament and that the balance between steam pressure and water level in the boiler was not easy to achieve. One consolation was that these engines were oil-fired and the fireman did not have to shovel coal all day.

My first lesson came on Extra 3553 West. As I climbed aboard the engine on the ready track I was greeted by a gruff character who was to be my instructor. I could tell he was not overjoyed to have a greenhorn on the trip. After checking over the engine I was full of confidence and set to go. The engineer climbed up and asked if I had heated the oil. This was a new one. I had visions of building a fire under the tender, since there was no obvious way of heating the oil. Furthermore, the need to heat the oil escaped me. Sensing my confusion, the fireman instructor placed his hand on a valve and said, "This is the way you heat the oil. This is a high-pressure steam line from the boiler to the tank. When you turn it on a jet of high-pressure steam is forced

"Pour some more oil to her, and shut off that damn blower! Now!"

In an early 1950 view from an F3 on a westbound freight stopped on the main track, a 4-8-4 heads into the siding at Durkee, Ore., with the eastbound *Pacific Limited*. W. V. Anderson

through the oil, warming it up."

I turned the valve and heard a hissing, gurgling sound from inside the tank. Sensing my further confusion, my instructor noted that in wintertime the bunker C oil got thick and would not flow properly through the atomizer unless it was kept warm. To thin the oil one juiced it periodically with a little hot steam.

I next learned that nothing moves as long as one blue flag or blue light (at night) is on the train. Workmen might be anywhere on or under the train. After the blue lights and flags had been removed, the conductor highballed us and the fun began. The first order of business was to have our massive steed hot and ready to go. "Turn the blower on and shoot the oil to her," said my instructor. "And don't let her pop." The pressure gauge hovered around 250 psi and edged up as the engineer eased the Johnson bar to full forward. Eying the gauge, I reached for the injector lever to keep her from popping. "Don't do that!" came a shout back. "He'll pull it out from under you."

"Who will pull what?" I asked.

"The engineer, when he opens her up," came the reply.

As our train eased out of the yard the engineer pulled the throttle almost full out, and the stack became a blast. All other sound was blotted out by the roar as the heavy train accelerated. Slowly we gained momentum, and just as slowly the steam pressure began to drop. "Pour some more oil to her, and shut off that damn blower!" shouted the fireman. "See that black string on the oil lever?" he asked, pointing to black twine wrapped around the oil lever quadrant. "Now!" he yelled.

"Now *what*?" I inquired.

"Hit the injector, you idiot — and when she gets water into the boiler turn on the feedwater pump." Gurgling noises came from the boiler. The fire was a raging inferno and the steam pressure climbed back to 250 psi. I turned the feedwater valve to a position marked by a red string, and the situation looked stable enough for me to relax a bit. I was elated. I had achieved success.

Then it happened. The engineer shoved the throttle closed and started fiddling with the brake levers. Black smoke rolled out of the firedoor, filling the cab and blocking all vision. "What's he doing?" I screamed.

"Turn on the blower, you dodo, and cut the oil."

"What's happening?" came my anguished wail as I grabbed for the blower.

Engine 3800, built by Alco in 1936 as UP 3900, the first 4-6-6-4, starts up the 2.2% out of Hilgard with a 70-car extra west on July 25, 1948.

"He's making a running brake test. Watch it — he's gonna open her up again." The engineer widened the throttle, and the steady roar of the exhaust blotted out all but hand signals. It was a nightmare. This poor novice was still struggling as the 80-car train pounded through the curve at Hilgard and hit the long 2.2 percent grade of the Blue Mountains.

As we met the grade, the situation stabilized. The engine steadied to a slow rhythmic beat. All went fine until the steam-pressure gauge reading began to drop. A voice from behind said, "Sand the flues."

"Sand the *what*?" I asked.

"The flues, dum-dum." The fireman grabbed the scoop, dipped it into the sandbox behind the fireman's seat, and threw a scoop of sand into the firebox. Black clouds erupted from the stack. "That cleans the soot out," said my now-irritated instructor. The engineer, casting a beady eye in my direction, asked if I had been one of the pilots who had fought in the war. I replied in the affirmative, hoping to regain some prestige. His reply did not help my sagging morale — he indicated that it was no wonder we had taken four years to whip the Germans.

After the flue episode I was thoroughly chagrined. Upon reaching Meacham, the fireman said he would take her on into Rieth and I could watch. Once we were on the ground at Rieth, my instructor became benevolent. He said I hadn't done too badly considering this was my first time. We grabbed our overnight bags, rode the switch engine back to the Pendleton station, and stayed in the old station hotel. The callboy roused us at an ungodly hour — 4 a.m., I believe — for an extra turn back to La Grande. The job was a little easier on the way back, but more was to come before this novice mastered the art of firing.

2-8-8-0 TO HUNTINGTON

A day later I was on a local freight headed east toward Huntington, again on a 2-8-8-0, again with an instructor. I found that working a local was a long and tiresome task — not quite as bad as some of the helper jobs on the east end but a job that, with all the starting, stopping, shifting, and reassembling of the train after picking up and depositing cars en route, kept the fireman busy. Our first chore this day was to drop two tank cars at a junction 13 miles east of La Grande. A pair of rusty rails meandered from the main line toward a little town in the distance. The engineer said the town was called Union and that the track belonged to another company.

Union, an old settlement on the Oregon Trail, had been bypassed by a few miles when the line to Portland came through. To connect with the main line, Union built its own line, the Union Railroad of Oregon. An old four-coupled engine had done the work. By 1945 it was retired but still was stored in a one-stall engine shed at Union, and URO used a small diesel locomotive bought second-hand from a lumber company. Three cars were its maximum load.

At the southern end of the Wallowa plain we picked up a helper for the climb to Telocaset. Here I got into trouble once more. My instructor had been patient to this point; seemingly he had found little fault with my firing. Our helper — another 3500-series articulated — coupled onto the rear, and we whistled off and started our climb. I had her hot, and everything was going well. The steam gauge indicated a steady 250

Added at Hilgard, 2-8-8-0s 3565 and 3520 assist Challenger 3800 on the head end. All engines are oil-fired. Two photos, Henry R. Griffiths Jr.

pounds. As the water in the glass sank lower and lower, I reached for the injector. I eased the feedwater pump on and was relieved to see the water climbing. I had been told to keep the water at about the three-quarter level or else. Nobody had explained what the "or else" meant.

As we pounded uphill the pressure began to drop — 240, then 230, then 220. "Ease off on the water," I was told. I turned off the feedwater pump and the pressure rose as the water level dropped. "Turn on the feedwater," came the voice. Again the pressure started to drop at an alarming rate. "Turn off the damn water," came the voice, surly now, apparently exasperated that I could not balance the two opposing items, cold water and steam. I was desperate. The glass was below one-half and the steam pressure was around 180 psi.

"What are you trying to do, burn the crownsheet?"

"What's a crownsheet?" was my question, barely audible above the roar of the exhaust and the clanking rods.

"Never mind, give me the damn thing!" my instructor cried. He shoved me from the seat. Things had gone too far now, and the fireman fought to keep enough steam and water in the engine. Finally we topped the hill at Telocaset, much to my relief and apparently much to the relief of the fireman.

That was only the beginning of my fights with the steam monsters, but after several trips I managed to master most of the intricacies of keeping a big articulated steaming in reasonably good fashion.

Next I took a trip on the Enterprise Branch, which ran east from La Grande in a great arc to the towns of Elgin, Enterprise, and Joseph. Our engine was a 3100-series light Pacific. The 60- and 80-pound rail precluded using heavy engines on the branch. The 4-6-2 normally could handle with little trouble the 8 or 10 freight cars and a combination car on the daily mixed. Because the branch was almost entirely on the floor of the Wallowa Valley, there were few grades with which to contend. After a trip on the branch I was pronounced ready for the extra board.

HELPER JOBS AND DEADHEADS

Novice firemen on the extra board usually were assigned to time freights, extras, or helper turns in either direction out of La Grande. (Passenger runs were held down by old-timers with seniority.) Most of my time was spent on the massive 3500-series articulateds.

Sometimes helper turns out of La Grande were short and pleasant. Other times they were a dreary 16 hours, much of which was spent in some desolate siding such as North Powder, Haines, or Durkee. Westbound trains usually consisted of about 80 cars and required four engines. The road engine always was a big articulated, and usually a 2-8-2 was helper up front. A second articulated was cut in midway in the train, and another brought up the rear. If you caught the Mikado or the helper in the center of the train you had to go all the way to Rieth with the train. The tail-end helper dropped off at Kamela, turned on the wye, and returned to La Grande. This was the job we unattached

"Turn on the blower, you dodo, and cut the oil."

Three trains meet at Meacham, Ore., in the mid-1940s. Engine No. 3520 is one of UP's 70 2-8-8-0s. Constructed during 1918–23 as Mallets, they were rebuilt as simple engines in 1937–44. Union Pacific

men wanted to catch because we would be back in town in about 5 or 6 hours and thus have more time for those interests which prompted us to start railroading here in the first place. Because of the dearth of men, our charming friends kept close check on the comings and goings of the single men on the extra board, and our return usually was well known before we hit the yard limit. As a consequence — especially if we had been out for 16 hours — we had little time for rest, and in all probability at the end of our 8-hour rest period the call boy would phone or would rouse us from badly needed sleep. We were young, however, and rebounded quickly.

Deadheading was an ordeal during that winter of 1945-46. Most trains ran in sections, and the *Portland Rose* often ran in as many as four sections. This train was an anathema to us when we were trying to make time over the road with a freight. We could go in the hole at a place such as Lime, just a few miles short of our terminal at Huntington, and see what seemed like a never-ending string of passenger trains bearing green flags. When we were forced to deadhead, it was not unusual for us to have to stand all the way from Pendleton or Huntington to La Grande because every seat was occupied. Unless we wanted to get back in a hurry, we tried to avoid deadheading, but often we were caught by the 16-hour law and had little choice.

No one was allowed to deadhead on the streamliner *City of Portland*, the hottest and only diesel-powered train on the line at that time. It passed through La Grande during the wee hours in either direction, so my infrequent glimpses of the flagship were a treat. My first sighting came after we went in the hole with an extra somewhere west of Kamela. Stopping an 80-car train on the downgrade was a chore. The reason for retaining more than one engine on the descent from Kamela to Pendleton became clear as I viewed the cherry-red brake shoes during a night stop on the hill. Not long after we cleared the main we heard the distinctive burbling of the *City* coming upgrade. Train 106 was scheduled to make the 74.2 miles between Pendleton and La Grande in 2 hours 9 minutes. This was an average of something like 35 mph over a stretch of mountain railroad that we often spent 6 to 8 hours covering in freight service.

Although I had watched the operations of the Baltimore & Ohio in West Virginia during my youth, I was almost totally unaware of the problems of mountain operations. Retainer valves were a mystery to me. Their use was a necessity in both directions out of La Grande. I was curious the first time my train was stopped going downgrade on the main line. I thought we had developed a hotbox or the train line had broken. The purpose of the stop merely was to cool the brakes and the wheels. The brakeman's task, which entailed skittering from car to car to turn up the retainers on every third car, was not easy — especially in winter.

MEMORABLE BREAK-IN TRIP

One trip on a mid-train helper stands out in memory. We were assigned engine 3556, just out of the shops after overhaul. Since this was a break-in run, the road foreman of engines and the shop supervisor were on hand. This congregation of people did not bother me because I was confident I could handle the engine. Little did I know what was to occur.

No trouble was encountered in getting steam pressure up to a full 250 psi. We started out of La Grande with the usual bang that westbound trains made, and the stack was really talking as we passed Hilgard and hit the grade. Then it happened — the old girl began to lie down on us, and nothing we did could keep the steam pressure from dropping. The road foreman shoved me out of the seat and made a futile attempt to keep the pressure from dropping more. Water was swapped for steam, steam for water, and still the gauge kept showing less pressure. When the water finally disappeared from the glass, no choice remained but to get some water over the crownsheet. Down went the gauge needle and on went the train brakes.

We were 3 miles up the hill, stalled and blocking the main line. But in a matter of minutes the steam pressure was climbing again. After pumping up the train line, we were on our way. All went well for about a mile, but the pressure fell again and we stalled a second time. The pressure built back up quickly and we were off again — only to stall a third time after another mile. We wondered if we ever would reach Meacham. Something was wrong with our steed.

We climbed down from the cab. In our examination we found water dripping from the seam edges of the boiler surrounding the firebox. Someone apparently had placed the incorrect tension on the staybolts. When the engine was not working, all appeared to be in order and the seams looked tight. When it was under load, a minute separation allowed water from the boiler to drip into the firebox, making it impossible to maintain sufficient heat to produce steam. Six hours and 8 miles from La Grande we finally made it into a siding. The lead engines and the rear helper doubled the train the last 5 miles to the top. We drifted back light to La Grande in defeat.

> *"What are you trying to do, burn the crownsheet?"*

Wintertime brought problems to the railroad out of La Grande, especially on the run to the west. To the east, few problems occurred; snow fences took care of drifts, and the rotary plow rarely had to go in that direction. Kamela, to the west, usually was buried in a blanket of white. Often the snow depth would equal the height of the engines. At Kamela, frozen switches were a problem. To keep the switches free the Union Pacific had undergirded the area with gas lines, and hundreds of little blue flames sprouted below the turnouts.

LEAVING LA GRANDE

Despite the hardships, railroading in the Blue Mountains was a pleasant experience. Early in February 1946 I received a wire from the airline instructing me to report to work in three weeks. I was reluctant to leave La Grande, but I had not seen my parents in three years. I sold my old Mercury and bought a train ticket to Clarksburg, W.Va. I kissed my redheaded lovely goodbye, boarded the eastbound *Portland Rose*, and left La Grande and the Union Pacific for good.

As I composed this article, I mentioned to my dear wife of a quarter century that, before I met her, in a place called Oregon I was considered very much a ladies' man. I was not prepared for her screams of laughter. I don't know what she found amusing.

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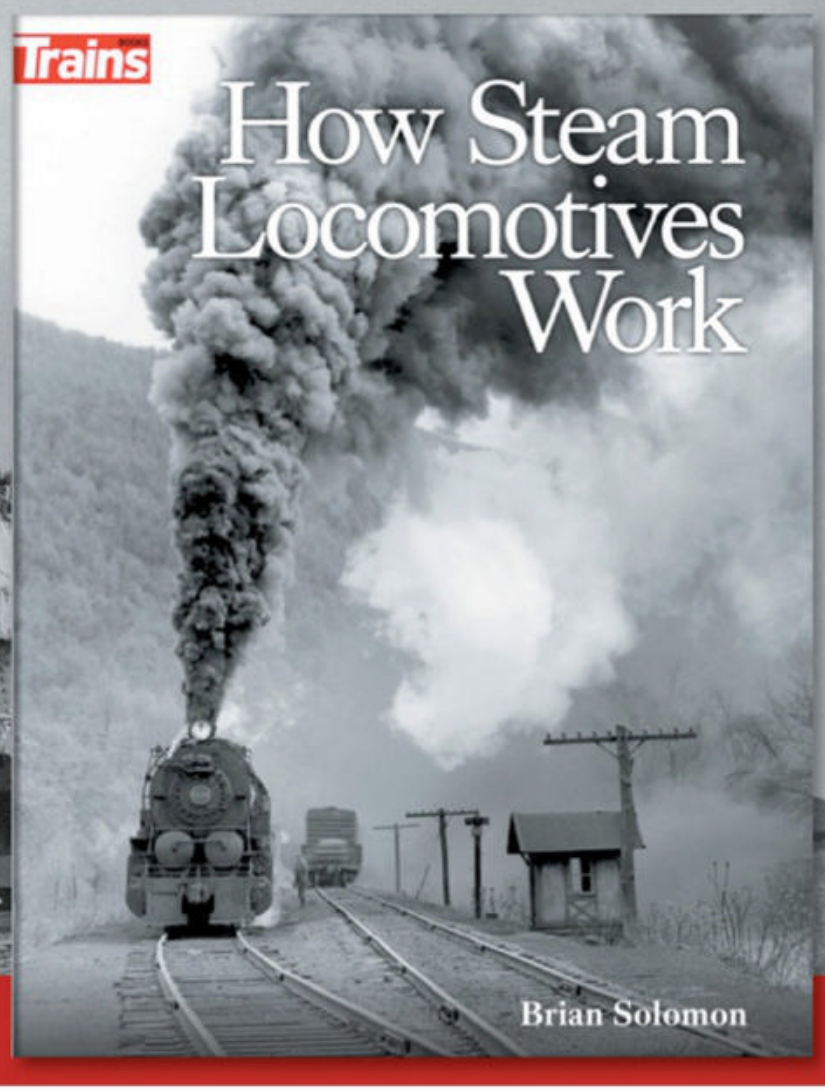

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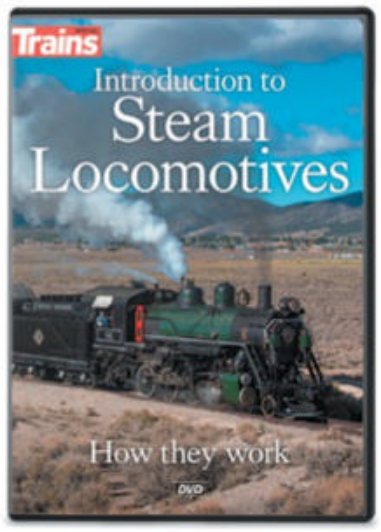

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